

Exploration on the use of learning strategies in writing for English major students

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ABSTRACT

Purpose: This study delves into the intricacies of writing learning strategies and systematically assesses their use.

Design/ Methodology/ Approach: By using quantitative methods, which include systematic questionnaires and CET-6 tests (CET stands for “College English Test,” a standardized English proficiency exam in China), this study collected a large amount of data to gain an in-depth understanding of the overall use of writing learning strategies. The study also examined the use of these strategies in colleges and universities at different levels, as well as the differences in strategy use by learners of different genders.

Finding: The study reveals that English major students utilize cognitive, metacognitive, and social-affective strategies to enhance their writing skills, with metacognitive strategies like planning and self-monitoring being particularly effective. However, challenges such as time management, motivation, and lack of guidance hinder effective implementation.

Conclusion: Significant differences were found in the use of metacognitive strategies among Chinese students, indicating their infrequent use in English writing. These findings suggest the need for targeted interventions to improve strategy application.

Implications: This study aims to provide a more in-depth and empirical understanding of writing education and to offer a strong basis for educational practice and policy-making. It seeks to offer practical writing teaching suggestions for educators to promote students' all-around development in writing.

Keywords: *Language learning, Learning strategies, Quantitative research, Writing skills, Writing strategies, Academic writing.*

1. INTRODUCTION

In the rapidly evolving landscape of global education, China has emerged as a key player, boasting a growing number of students pursuing higher education. Among the myriad academic skills essential for success in this setting, proficiency in English writing holds a distinct significance (Gottlieb, 2016). The ability to effectively express ideas in written English is indispensable, not only for academic excellence but also for future career prospects and global communication (Graham, 2018). To excel in this endeavor, students employ a variety of strategies to promote foreign language writing.

Language learning strategies encompass a diverse array of techniques, strategies, and resources for acquiring, understanding, and utilising a foreign language. They are of paramount importance in the context of foreign language writing (Szyszka, 2017). These strategies empower students to navigate the intricate nuances of the English language, enabling them to construct coherent and compelling written content. It is evident that language learning strategies play a pivotal role in the acquisition of a foreign language. As a result, it is critical to examine how Chinese university students use language learning strategies in their English writing (Deng, 2024).

Despite the growing emphasis on English language education and the acknowledgement of the significance of language learning strategies, there is a notable absence in the literature on the use of language learning strategies in Chinese English writing (Hu & Sun, 2017). This research gap prompts an exploration of the strategies employed

by Chinese university students to improve their English writing skills. This will help them to gain a deeper understanding of their approaches.

The purpose of this study is to delve into the specific strategies employed by Chinese university students in their English writing endeavors. By examining the efficacy and diversity of these strategies, we aim to provide valuable insights into the teaching and learning process, ultimately contributing to the enhancement of English writing education in China. This research holds immense significance, as it aligns with the broader goals of promoting academic excellence and improving communication skills, both of which are integral to China's aspirations for a globalized education system. Furthermore, it has the potential to inform pedagogical practices and curriculum development, ultimately benefiting students striving to excel in English writing within the context of higher education in China.

1.1. Research Questions

- What are the most and least frequently used learning strategies for English writing among Chinese university students?
- Is there any difference in the use of writing strategies between English major and non-English major learners, as well as learners from different levels of higher education providers (HEPs)?
- Is there any relationship between using each writing strategy and the participants' English writing proficiency?
- When using writing strategies, are there gender differences between men and women? What's the difference?

2. LITERATURE REVIEW

The acquisition of English as a Foreign Language (EFL) stands as a foundational pursuit for college students, mandated throughout the initial two years of study (Hyland, 2003). The College English Curriculum Requirements are designed to cultivate students' proficiency in listening, speaking, and writing in English. However, English writing poses a considerable challenge for Chinese students, revealing deficits in both syllabus alignment and societal expectations (Zhu, 2022). Scholars such as Pan (2015); Liu (1999); Cai (2018) and Yang (2015) underscore the inadequacy of college English writing in China, necessitating urgent research and discourse on effective writing pedagogy.

You (2004) posits that English writing instruction in China often fixates on correctness and test-taking methodologies. Two methodologies—process-oriented and product-oriented—predominate, with the former emphasizing the quality of students' actions and the latter focusing on formal accuracy at the sentence or paragraph level (Silva, 1993). Despite their application, both approaches exhibit limitations in addressing the complexities of writing challenges (Hayes, 1981). In response, Chinese educators and researchers have engaged in a decade-long exploration of effective writing teaching methods and factors influencing students' writing proficiency (Wen, 2004).

As a comprehensive skill, writing evaluates not only knowledge but also organizational, analytical, and expressive abilities (Graham, 2018). Given its critical role, the enhancement of writing skills holds paramount significance for the English learning journey of college students (Oshima & Hogue, 2007). Although traditional writing pedagogy involves teacher-led proposition and demonstration, student imitation, and training (Elbow, 1998) contemporary teaching methods are evolving to integrate students into contextualized topics, fostering creativity (Graves, 1983). Despite these advancements, writing remains a substantial challenge for both students and teachers (Murray, 1985). Some students perceive writing as deceptively simple yet struggle to attain high proficiency levels, leading to resistance (Hyland, 2003). Consequently, educators should actively assist students in uncovering effective writing strategies and skills to instill a sense of accomplishment.

Because English is a global language, it is widely used worldwide, and its acquisition is commonly perceived as challenging, particularly in the context of writing. According to Brown (2014) writing involves the creation of ideas that contribute to students' knowledge. Blanchard and Root (2008) emphasize the difficulty associated with learning to write in a new language.

(Scott, 1990) adds a positive perspective, defining writing as an enjoyable activity that offers advantages to students. Despite its inherent difficulty, writing remains a valuable, essential, integral, and enjoyable component of

foreign language courses. Writing skills encompass multiple components, including word choice, grammar usage, syntax, mechanics, and the organization of ideas into a coherent form [Gebhard et al. \(1996\)](#). Writing allows students to express their personalities, and even guided activities, such as story copying, offer options for students.

In English education, writing is a crucial skill among others. Although writing skills hold significance, [Yulianti, Nuraeni, and Parmawati \(2019\)](#) note a lack of adequate attention, time allocation, and focus on the learning process in teaching. Achieving proficiency in writing requires an understanding of its elements. Writing is acknowledged as one of the most challenging skills for students ([Adas & Bakir, 2013](#)) and [Sari and Fitrawati \(2018\)](#) highlight the importance of students being able to write and comprehend functional texts and short passages, such as narratives, descriptions, and narrations, relevant to their daily lives. Consequently, guiding students to develop effective writing skills poses a considerable challenge for teachers.

In the domain of second language writing, proficiency extends beyond linguistic skills to encompass cognitive, social, and cultural dimensions. As suggested by [Hyland \(2003\)](#) writing involves critical thinking and organization, demanding analysis, evaluation, and synthesis of information while logically structuring thoughts. The importance of social skills in writing is emphasized by [Canagarajah \(2005\)](#) who underscores audience awareness and the role of cultural context. Additionally, [Warschauer \(2004\)](#) highlights the recognition of technology and digital literacy in modern writing. Consequently, second language writers must not only possess language proficiency but also the cognitive, social, and technological skills necessary for effective communication in a new language and culture.

The etymological derivation of the English term "strategy" finds its roots in the ancient Greek word "strategia," originally employed in military contexts to signify the art of war and the optimal arrangement of troops, ships, or other military assets. Evolving with linguistic development, "strategy" has transcended its military connotation and emerged as a ubiquitous term, permeating diverse domains of work and study. It now encapsulates a spectrum of connotations, encompassing schemes, tactics, techniques, and artistic endeavors.

The conceptualization of learning strategy materialized subsequent to Bruner's introduction of "cognitive strategy" in 1965. Nevertheless, the absence of a universally accepted definition persists, as divergent viewpoints among researchers reflect disparate vantage points and research scopes. Current research delineates three overarching perspectives: 1. Learning strategy: the procedural, methodological, and rule-based facet of learning. 2. The learning strategy serves as the cognitive information processing mechanism in learning. 3. Learning strategy is a combination of learning monitoring and methodological approaches. So, the word "learning strategy" refers to an overarching and generalized way that students change their own learning behaviors and cognitive activities in order to improve their overall learning efficiency and effectiveness in educational settings. This includes understanding learning tasks, using learning methods, and keeping an eye on the learning process.

Primarily, any procedure, method, rule, skill, or control mechanism that contributes to increased learning effectiveness and efficiency falls under the purview of learning strategies. Secondly, learning strategy goes beyond specific learning methodologies, encompassing the selection, organization, and processing of a variety of learning methods. A tertiary learning strategy denotes a higher cognitive ability that governs the learning and cognition processes. Within the sphere of second language acquisition, diverse researchers proffer distinct interpretations of language strategies, each yielding unique definitions of language learning strategies.

[Bialystok \(2009\)](#) advocates for learning strategies as the most ideal means of leveraging effective information to enhance proficiency in second language acquisition. [Stern \(1983\)](#) defines learning strategies as the overarching trends or general characteristics guiding language learners' approaches, distinguishing specific forms of consciously or subconsciously adopted learning behaviors as learning techniques. [Weinstein, Mayer, and Beale \(1986\)](#) define learning strategies as behaviors or cognitive processes that learners adopt to facilitate information processing during learning endeavors. [Rubin \(1987\)](#) contends that learning strategies play a pivotal role in shaping learners' self-constructed language systems, thereby directly influencing language development. According to [Wenden \(1987\)](#) learning strategies are instrumental in helping learners construct personalized language learning systems, which include plans, steps, and actions to acquire, store, and use information. [Rebecca L Oxford \(1989\)](#) asserts that learning strategies manifest as conscious actions, behaviors, and methods that students employ to refine their second language skills, facilitating the storage, revision, and application of newfound languages. [O'Malley and Chamot \(1990\)](#) defined learning strategies as the special thoughts and behaviors that learners use to help them

understand, learn, and remember new information. According to [Ellis \(1997\)](#) strategies are mental and behavioral activities associated with a specific stage in the overall process of language acquisition and use.

Diverse scholarly perspectives, arising from distinct criteria and starting points, contribute to variations in research emphases within the field of language learning strategies. Language learning strategies encompass an array of consciously adopted methods, skills, or measures employed by learners to enhance the efficiency and effectiveness of language acquisition during the learning or application process. Both macro and micro dimensions manifest these strategies: macro strategies involve the planning, control, and evaluation of learners' overarching objectives, processes, and outcomes, while micro strategies focus on optimizing specific learning activities or tasks. Furthermore, learning strategies can manifest as either internal mental processes or external activities. The overarching learning method, defined as the learning strategy, varies significantly from individual to individual ([O'Malley & Chamot, 1990](#); [Rebecca L Oxford, 1989](#); [Wenden, 1987](#)).

Despite extensive research, there remains a significant gap in understanding the most effective writing instruction methods for Chinese EFL learners. Existing studies highlight the challenges and inadequacies in current pedagogical approaches but lack comprehensive solutions that integrate cognitive, social, and technological dimensions of writing. Further research is needed to develop and evaluate innovative teaching methods that address these multifaceted challenges and effectively enhance writing proficiency among Chinese college students.

3. METHADODOLOGY

The study employed the quantitative research method, characterized by a survey design, to collect and analyze data on the writing strategies of Chinese college students in a structured and systematic manner. This method provided several advantages for investigating a large sample of participants and allowed for the exploration of patterns, relationships, and trends within the collected data ([Creswell, 2013](#)).

3.1. Data Collection Method

A two-part questionnaire was employed for data collection. The first part was designed to gather participants' demographic information, encompassing details such as gender, majors, universities, and official English writing test scores (e.g., the College English Test in China). The second part aimed to collect data regarding participants' utilization of various strategies in English writing. The questionnaire items were adapted from [Pongsukvajchakul \(2021\)](#) strategy inventory for foreign language writing, which is grounded in well-established theories related to foreign language learning strategies ([Oxford, 2003](#); [Oxford & Burry-Stock, 1995](#); and [Oxford, as cited in Hismanoglu \(2000\)](#)). This comprehensive questionnaire consisted of 50 items ([Appendix A](#)), each rated on a five-point Likert scale, aligning with six distinct constructs. Prior to this study, the questionnaire had been utilized by [Pongsukvajchakul \(2021\)](#) with demonstrated reliability and validity. It had also undergone a pilot study in the researchers' context, which confirmed its reliability with a Cronbach's alpha exceeding .70, as shown in [Table 1](#).

Table 1. Cronbach's alpha statistics among six strategies.

Construct	Items	Conbach's alpha
Social strategies	8	0.81
Memory strategies	9	0.96
Compensatory strategies	7	0.82
Metacognitive strategies	9	0.76
Cognitive strategies	10	0.86
Affective strategies	7	0.88

3.2. Research Population

Wenjuanxing, a Chinese online survey platform, distributed the questionnaire online to 1589 Chinese students representing 245 HEPs across China, obtaining their consent. We employed snowball sampling as the data collection method for this study because it effectively reached a wide and diverse participant pool within the given

timeframe and resources (Creswell, 2013). Initially, a set of students from various universities was invited to participate in the survey, and they, in turn, were encouraged to share the survey link with their peers. This approach facilitated access to a broader spectrum of Chinese college students, ensuring a more comprehensive representation of different institutions and backgrounds. Snowball sampling was particularly useful in reaching students from various regions, disciplines, and English proficiency levels, as it allowed for the organic expansion of the participant pool, capturing a richer diversity of perspectives and experiences.

3.3. Data Analysis

The collected data was firstly organized to ensure the convenience of analysis. It should be mentioned that, since the participants came from different HEPs, they were broadly categorized into non-985/211 HEPs and 985/211 HEPs1. Additionally, due to their potentially varying levels of English proficiency, we categorized the participants into English majors and non-English majors across various programs. The data was then put into Statistical Package for Social Sciences 14.0 to check first its normal distribution. Both descriptive and inferential statistics were used. In the first question, a single-sample t-test was employed, with a median of 3 as the reference point to assess the frequency of students' utilization of specific learning strategies. The second question employs an independent sample t-test, while the third question employs a correlation test. The fourth question uses an independent sample t-test.

In this paper, more than 1600 students filled out the questionnaire, but 1,589 students answered all the questionnaire questions, making up an effective sample.

4. FINDING

A one sample t test was first used to compare the average frequency of the use of each learning strategy in writing among the participants. Considering that the utilized questionnaire was a five-point Likert one, the median, which was 2, was used as the benchmark for comparison. The descriptive statistics in Table 1 demonstrated that the averages of all constructs were either over or below the median. Table 2 presents One sample t-test of the average frequency of the use of each learning strategy. The inferential statistics in Table 3 indicated that the average of metacognitive strategies is 2.21, 95% confidence interval [-.95, -.63]. This difference was found to be statistically significant, $t = -10.13$, $p < .001$, and large, $d = -1.4$. This finding suggested that metacognitive strategies were used less frequently by Chinese students in English writing.

Table 2. One sample t-test of the average frequency of the use of each learning strategy.

One-sample test					
Strategies	Test value = 3				
	t	Sig. (2-tailed)	Mean difference	95% confidence interval of the difference	
				Lower	Upper
Memory	-10.134	0.000	-0.790	-0.95	-0.63
Compensation	1.022	0.312	0.120	-0.120	0.36
Affective	3.104	0.003	0.284	0.100	0.468
Metacognitive	1.144	0.258	0.105	-0.079	0.289
Cognitive	0.943	0.350	0.095	-0.107	0.297
Social	-0.322	0.749	-0.030	-0.218	0.158

In Table 3, the other difference was found in the use of memory strategies, $M = 3.28$, 95 confidence intervals [0.10, 0.47], $t = 3.10$, $p = 0.003$, and small to medium effect size, $d = .44$. This demonstrates that the participants used memory strategies more frequently in English writing. However, we found no statistical differences among the other strategies, suggesting a moderate frequency of their use.

Table 3. One sample t-test of the average frequency of the use of each learning strategy.

Strategies	Mean	Std. deviation	Std. error mean
Memory	2.210	0.545	0.078
Compensation	3.120	0.830	0.117
Affective	3.284	0.646	0.091
Metacognitive	3.105	0.648	0.091
Cognitive	3.095	0.712	0.100
Social	2.970	0.659	0.093

Then, an independent samples t test was run to compare the use of learning strategies between the participants of different universities, as per the second research question. The descriptive statistics in Table 4 and the inferential statistics in Table 5 revealed that there was a significant statistical difference in the use of metacognitive strategies between the students from 985/211 universities (M = 3.39, SD = .78) and those from non-985/211 universities (M = 2.80, SD = .79), $t = 2.62$, $p = .012$, two-tailed. The effect size was large, $d = 0.975$.

Table 4. The descriptive statistics of the use of learning strategies of different universities.

Group statistics				
Strategies	University level	Mean	Std. deviation	Std. error mean
Memory strategy	985/211 HEPs	3.39	0.782	0.151
	non-985/211 HEPs	2.80	0.787	0.164
Compensation strategy	985/211 HEPs	2.32	0.538	0.105
	non-985/211 HEPs	2.08	0.537	0.112
Affective strategy	985/211 HEPs	3.130	0.641	0.123
	non-985/211 HEPs	3.465	0.619	0.129
Metacognitive strategy	985/211 HEPs	3.065	0.653	0.126
	non-985/211 HEPs	3.152	0.656	0.137
Cognitive strategy	985/211 HEPs	3.037	0.696	0.134
	non-985/211 HEPs	3.163	0.749	0.154
Memory strategy	985/211 HEPs	3.000	0.724	0.139
	non-985/211 HEPs	2.935	0.590	0.123

Table 5 revealed that although the averages of the other constructs differed between the two comparison groups, the statistical difference was not significant ($p > .05$). The results showed that the participants, even though they had different levels of HEPs, did not differ in how they used prescribed strategies when writing in English. The only strategy that did differ was metacognitive strategies, which were used more often by students with higher levels of HEPs.

Table 5. The inferential statistics of the use of learning strategies between different universities.

t-test for equality of means			
	t	Sig. (2-tailed)	Mean difference
Memory	2.626	0.012	0.585
Compensation	1.549	0.128	0.238
Affective	-1.874	0.067	-0.336
Metacognitive	-0.471	0.640	-0.087
Cognitive	-0.620	0.539	-0.126
Social	0.345	0.731	0.065

Similar findings were also found in the bivariate Pearson's correlation coefficient (r) was calculated. As shown in Table 6, the bivariate correlation between English writing proficiency and the use of metacognitive strategies in writing was positive and strong, $r = .91$, $p < .001$, which implied that the students proficient in English writing tended to use metacognitive strategies more than their less proficient counterparts. Although there also existed

either positive or negative correlations between English writing scores and other constructs, the correlations were not statistically strong ($p > .05$). This suggested that using other strategies was not related to one's English writing proficiency.

Table 6. Pearson's correlation between proficiency and the use of strategies.

Correlations		
Strategies		Scores
Memory strategy	Pearson correlation	0.908
	Sig. (2-tailed)	0.000
Compensation strategy	Pearson correlation	-0.073
	Sig. (2-tailed)	0.616
Affective strategy	Pearson correlation	0.112
	Sig. (2-tailed)	0.437
Metacognitive strategy	Pearson correlation	-0.077
	Sig. (2-tailed)	0.595
Cognitive strategy	Pearson correlation	-0.236
	Sig. (2-tailed)	0.099
Social strategy	Pearson correlation	-0.049
	Sig. (2-tailed)	0.736

Note: **. Correlation is significant at the 0.01 level (2-tailed).

An independent sample t test was also carried out to check the differences in strategy use between male and female students. The descriptive statistics in Table 7 and the inferential statistics in Table 8 revealed that there was a significant statistical difference in the use of metacognitive strategies between males ($M = 3.23$, $SD = .71$) and females ($M = 2.98$, $SD = .56$), $t = 2.42$, $p = .018$, two-tailed. The effect size was small to medium, $d = 0.38$.

Table 7. The descriptive statistics of differences in strategy use between male and female students.

Group statistics				
Strategies	Gender	Mean	Std. deviation	Std. error mean
Memory strategy	Male	2.23	0.558	0.112
	Female	2.19	0.543	0.111
Compensation strategy	Male	3.17	0.851	0.167
	Female	3.06	0.822	0.168
Affective strategy	Male	3.229	0.570	0.112
	Female	3.34	0.729	0.149
Metacognitive strategy	Male	3.22	0.712	0.140
	Female	2.979	0.561	0.115
Cognitive strategy	Male	3.183	0.665	0.131
	Female	3.000	0.763	0.156
Social strategy	Male	2.923	0.659	0.129
	Female	3.021	0.671	0.137

Table 8 revealed that the averages of the other constructs differed between the two comparison groups; the statistical difference was not significant ($p > .05$).

These findings suggested that there were significant differences in the use of memory strategies. Male and female students exhibit remarkably similar strategy usage patterns, with no significant differences in strategy use identified between the two groups.

Table 8. The inferential statistics of differences in strategy use between male and female students.

Independent samples test						
Strategies	Levene's test for equality of variances		t-test for equality of means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference
Memory	0.111	0.740	0.280	47	0.781	0.044
Compensation	0.227	0.636	0.467	48	0.643	0.111
Affective	1.585	0.214	-0.624	48	0.536	-0.115
Metacognitive	2.416	0.127	1.327	48	0.018	0.242
Cognitive	0.356	0.553	0.904	48	0.370	0.183
Social strategy	0.067	0.796	-0.520	48	0.606	-0.098

5. DISCUSSION

First, the findings above revealed that Chinese students, on average, employed metacognitive strategies less frequently in English writing, aligning with previous research by [Chen and Xiao \(2016\)](#) and [Shao \(2018\)](#). These studies consistently reported that Chinese university students tended to use metacognitive strategies less frequently in English writing compared to other strategies. The consistent nature of these findings underscores a prevalent trend among Chinese learners, indicating a potential area for targeted pedagogical interventions. In contrast, the conspicuous prevalence of memory strategies, surpassing the utilization of other strategies, resonates with the observations made by [Cui and Kaur \(2023\)](#). The emphasis on memory strategies as a dominant approach to language learning aligns with the broader educational landscape in China, where traditional rote memorization has been deeply ingrained [Wang, Leung, and Jiang \(2021\)](#). Memory strategies definitely help with learning new words and remembering them, but focusing too much on them could hurt more complex mental processes needed for good writing and stop people from developing more strategic and independent ways of learning ([R. L. Oxford, 1990](#)). These echo ideas put forward by many scholars who advocate a more balanced and holistic approach to language learning that goes beyond memorization ([Brown, Ryan, & Creswell, 2007](#)). The findings also prompted consideration of the implications for language teaching. If there is too much emphasis on memory strategies, teaching methods and curricula may need to be re-evaluated to promote a more balanced integration of metacognitive strategies. This was essential not only for developing vocabulary acquisition but also for developing higher order thinking skills necessary for effective writing ([Ebadi & Rahimi, 2018](#)).

Previous research has emphasized the importance of metacognitive strategies in improving learning outcomes. Research has shown that students who are actively involved in metacognitive processes tend to demonstrate better academic performance and a deeper understanding of the material ([Flavell, 1979](#); [Schraw & Dennison, 1994](#)). The present study is consistent with this literature and suggests that students at higher-ranked universities are more likely to use metacognitive strategies in English writing. The findings indicate that there are significant differences in the use of metacognitive strategies among students from different ranked higher education providers (HEPs), with those from 985/211 and non-985/211 universities exhibiting the most notable differences. Students at HEPs may have access to superior resources, more experienced faculty, and more rigorous academic environments, which may lead to differences in learning strategies ([Kuh, 2001](#); [Pascarella & Terenzini, 1980](#)). However, it is necessary to consider theories that contradict these findings or provide alternative explanations for them. Theories such as social cognitive theory ([Bandura, 1986](#)) and socio-cultural theories of cognitive development ([Vygotsky & Cole, 1978](#)) emphasise the role of social interaction and cultural context in shaping cognitive processes. These theories suggest that not only institutional factors but also social and cultural factors influence students' learning strategies. Therefore, cultural or social differences between students at different types of universities may account for the observed differences in the use of metacognitive strategies.

Furthermore, the study failed to find significant differences in the means of other learning constructs, which calls into question the generalizability of the findings. This discrepancy is at odds with some theories that propose the combined effect of institutional prestige on different aspects of student learning. For example, [Tinto \(1975\)](#) model of student integration suggests that institutional characteristics, including academic and social integration, collectively influence student success. The lack of significant differences in other learning constructs challenges the idea that institutional prestige uniformly influences all aspects of students' English writing learning strategies. The

current study may not fully capture the potential impact of individual student differences, such as prior academic preparation or motivation to learn. Individual differences may lead to differences in the use of metacognitive strategies, regardless of institutional prestige.

The results of the bivariate Pearson's correlation coefficient analysis revealed a significant and strong positive correlation between English writing proficiency and the use of metacognitive strategies in writing. This finding aligned with existing literature that emphasizes the positive relationship between language proficiency and the application of metacognitive strategies in writing (Harmon-Jones, 2019; Smith & Anderson, 2018). The strong correlation implied that students who excel in English writing tend to employ metacognitive strategies more frequently than their less proficient counterparts. Studies that emphasize the role of metacognitive strategies in enhancing language skills, such as self-awareness, planning, monitoring, and evaluation of one's writing process, align with the observed positive correlation (Brown, 2017; Flower & Hayes, 1980). This suggests that linguistic knowledge alone does not solely determine proficiency in English writing, but also the strategic and reflective approaches employed during the writing process.

Nevertheless, it is important to note that the correlation between English writing scores and other constructs, apart from metacognitive strategies, was not statistically significant. This implies that the utilization of these other strategies is not significantly associated with students' English writing proficiency. These findings challenge previous studies that have suggested a correlation between the use of learning strategies and factors such as writing fluency, vocabulary use, or grammatical skills (Cheng, 2016; Zheng, Johnson, & Zhou, 2020). Differences in the study populations, methodologies, or measures used to assess writing proficiency and other constructs may account for the discrepancy in these findings.

The gender differences observed in the utilization of memory strategies are consistent with studies that emphasize differences in cognitive processing and learning strategies between male and female individuals (De Lisi & Wolford, 2002; Hyde & Mertz, 2009). Social and cultural factors that influence learning experiences and preferences can account for these differences. For instance, research indicates that females may be more inclined to utilize rehearsal and organizational strategies, which may result in enhanced recall (Jansen, Van Leeuwen, Janssen, Jak, & Kester, 2019). Interestingly, although there were discrepancies between male and female students' means in other domains, these discrepancies were not statistically significant. This suggests that male and female students exhibited comparable patterns of strategy utilization, except for memory strategies. This finding is at odds with several previous studies that have reported gender differences in the use of various cognitive and metacognitive strategies (Hyde & Mertz, 2009; Voyer, Voyer, & Saint-Aubin, 2017). These results may be inconsistent because of the specific strategies assessed, the sample characteristics, or the measures used in different studies.

Metacognitive strategies are important methods and steps to plan, regulate, evaluate, and reflect on learning behaviors and processes. In college, compared with males, females are more prominent in learning motivation and attitude, self-assessment, and the use of auxiliary tools (Ping & Liow, 2011). O'Malley and Chamot (1990) pointed out that metacognitive strategies are widely regarded as one of the main reasons for the difference in learners' learning level, which may also be one of the important factors leading to the significant improvement of Chinese women's English learning level and comprehensive application ability in recent years.

In terms of cognitive strategies, females use strategies more frequently, and their overall performance is more stable. This analysis result is consistent with Li (2019) research conclusion that there are significant gender differences in the use of cognitive strategies by students of various genders. Cognitive strategy is the process of processing, integrating, and storing information. The cognitive strategy forms the foundation of the learning strategy system, and it is crucial for learners to prioritize the independent formation and training of this strategy. In the absence of a foreign language environment in most areas of our country, active language input and memory are particularly important. Female students are more likely to focus on subjects that require memorization and repetition, while male students spend more time training on science questions, which are also important in the findings.

In terms of social and emotional strategies, female students are better than male students in using social and emotional strategies, and female students are better at managing their own emotions and cooperating with others in learning English writing. This result is consistent with the research conclusion of Yao, Pan, and Cao (2010). Through investigation and research, they found that there are significant gender differences in the use of social emotional strategies by male and female students. O'Malley and Chamot (1990) collectively referred to social

strategies and emotional strategies as social emotional strategies. They emphasized that social strategies can provide learners with more learning opportunities, while emotional strategies can enhance learning motivation, interest, and willpower. Wen (2004) demonstrated that female students are field-dependent and willing to communicate and cooperate with others in order to learn. Male students are field independent and tend to solve problems independently, which can explain the above findings in terms of cognitive style. One possible explanation for the lack of significant gender differences in the use of other strategies could be the complexity and multifaceted nature of cognitive and metacognitive processes. The strategies examined in this study might not capture the full spectrum of cognitive approaches employed by students in different gender groups. Additionally, individual variations within each gender group could mask potential group-level differences in strategy use.

6. CONCLUSION

In conclusion, the comprehensive analysis of learning strategy usage among Chinese university students in the context of English writing reveals significant patterns that carry practical implications for educators, curriculum designers, and researchers. The findings emphasize the importance of considering various factors influencing learning strategy preferences, as well as the need for tailored interventions to enhance students' language learning experiences.

The study revealed significant differences in the low frequency with which Chinese students use metacognitive strategies in English writing. Metacognitive strategies are crucial for systematic learning and provide opportunities for targeted interventions to enhance planning and monitoring skills. In contrast, there were significant differences in the use of memory strategies by Chinese students, with a relatively high frequency of use, suggesting that they recognize the importance of memory-related skills in language learning. The study identified differences in the use of learning strategies among participants from different universities, indicating that institutional factors may influence the utilization of these strategies. The findings revealed that students at more prestigious universities exhibited a higher frequency of metacognitive strategy use, suggesting the necessity for skill development interventions. The strong positive correlation between English writing proficiency and metacognitive strategy use underscores the importance of integrating metacognitive skill development into writing instruction. Gender-related analysis revealed a significant difference in memory strategy usage, emphasizing the need for gender-sensitive instructional approaches.

7. SUGGESTION

To improve writing skills, educators should integrate metacognitive strategy training, which promotes explicit instruction in planning, monitoring, and evaluating writing processes. Collaborative learning, utilizing socially effective strategies like peer review sessions and group projects, fosters shared learning experiences and feedback. Incorporating digital tools allows for interactive learning and immediate feedback, while addressing individual differences through differentiated instruction caters to a variety of learning styles. Enhancing time management skills and providing continuous, constructive feedback are crucial, along with incorporating reflective practices and fostering a positive writing environment. Aligning curriculum with real-world writing tasks motivates students, and ongoing professional development ensures educators stay updated on effective teaching practices.

8. LIMITATION

Due to the influence of sample size, research content, and the author's subjective factors, this study still has some shortcomings in many aspects. The first limitation pertains to the scope of the research. Given the complexity and diversity of the definition and classification of writing learning strategies, further research is necessary to determine if the strategies included in this survey, along with the survey results, accurately represent the actual state of writing learning strategies. Numerous factors, including learners' learning style, cognitive style, learning level, and various external situational factors, influence the use of writing learning strategies. Secondly, this study's sample size was limited. The study's research objects are limited to different schools. Expanding the sample size and selecting different majors will make the samples more representative and the research conclusions more universal. Therefore, in future studies, researchers can also consider and control as many research variables as possible.

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INSTITUTIONAL REVIEW BOARD STATEMENT

The Ethical Committee of the Henan University of Technology, China has granted approval for this study on 6 January 2024 (Ref. No. HUT-ETH-006).

TRANSPARENCY

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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Appendix A. English writing strategies questionnaire

Description of the questionnaire:

1. The purpose of this questionnaire is to understand your English writing process and to investigate the strategies you use in writing. This survey is only for scientific research purposes and has nothing to do with academic performance.
2. This questionnaire adopts a 5-level scoring system. The numbers 1-5 represent 5 choices, respectively representing different degrees of conformity. They respectively represent:
 - 1- completely or almost completely inconsistent with my situation (1 point);
 - 2- Usually not in my case (2 points);
 - 3 Sometimes in my case (3 points);
 - 4- Often fits my situation (4 points);
 - 5- Completely or almost completely in my case (5 points).

You can only choose one answer for each question. Multiple or no choices are considered invalid. Depending on your situation, any answer is possible, and there is no right or wrong answer. Please read the following questions carefully and tick "v" according to your actual situation. After answering the question, the corresponding score will be filled in the statistical table after the paper according to the question number.

Please note: To ensure the authenticity of the data, the answer must be a true reflection of your situation!

Private information:

Name: Gender: Age: Major:
 University: Faculty: Years of learning English :

CET-4 scores: CET-6 scores:

Part A. Memory strategy

1. When writing an English essay, I will think of words related to the topic from the essay title. For example, words related to the topic of environmental protection include "ecological environment, air pollution, greenhouse effect, global warming" and so on.
2. When I write, I will be reminded of my own or others' experiences or stories I have heard or seen. (For example, when On Attending Your Classes Regularly, think of the students around you who have failed due to absent classes)
3. Do you read your essay aloud as you write in order to better remember and understand what you are writing?
4. During the writing process, do you use notes or notebooks to record and recall important writing ideas or inspirations?
5. Do you use keywords or phrases to help you remember the main ideas and details of your writing?
6. Do you discuss writing topics with classmates or friends in order to better remember and organize your writing?
7. Have you ever used images, diagrams, or mind maps to help organize and remember writing material?
8. When preparing to write, do you review previous writing notes or related materials to help you remember and organize information?
9. Do you reinforce and improve your writing by re-reading and revising it after it is finished?

Part B. Cognitive strategy

10. I usually recite some model essays or well-written paragraphs, and consciously imitate and use them in writing compositions.
11. In the process of writing, I will look back and read the words and sentences I have just written.
12. I write the composition once again even if it is no longer modified.
13. When revising the composition, I consider whether the content of the thought is clearly expressed, and make appropriate additions or deletions to the content
14. When revising the composition, I consider the logical connection between sentences and adjust the paragraph organization structure of the article.
15. When revising my composition, I consider whether the choice of words is appropriate, whether the combination of phrases and the parts of speech are correct.
16. I corrected grammatical errors such as verb tense, subject-verb agreement, sentence structure and clause.
17. When revising my composition, I correct spelling, punctuation, capitalization, ellipsis and other mistakes.
18. When writing an English composition, I use some connective words (such as and, but, however, firstly, secondly, in a word, in short, to conclude, etc.) to make the content logical and the article cohesive easily.
19. I use some rhetorical means (such as metaphor, personification, quoting proverbs or famous sayings, rhetorical questions, parallelism, etc.) to make the article vivid.

Part C. Compensation strategy

20. If you can choose, I will choose their own favorite, within the ability of the topic to write, rather than hard scalp to deal with difficult to write the topic.
21. When I encounter words and sentences that cannot be expressed, I take an evasive attitude and use simpler words and sentences. (e.g. situation instead of phenomenon On Attending Your Classes Regularly)
22. When I can't think of appropriate and accurate words to express my thoughts, I use roundabout (roundabout) statements or use synonyms or synonyms to replace. (e.g. On Attending Your Classes Regularly, write "not attend" instead of "absent")
23. When writing, do you use a dictionary or translation tool to find unfamiliar words?
24. If you encounter difficulties in the writing process, will you ask your classmates or teachers for help?
25. Do you make a detailed plan or outline before writing to help organize your thoughts?
26. After writing, do you take the initiative to revise and polish to ensure the accuracy and fluency of the expression?

Part D. Metacognitive strategy

27. when writing, I eliminate other factors to interfere, concentrate, concentrate on writing the article well.

28. First, I will analyze which part or aspect is the focus of writing according to the requirements of the topic, and make sure that every content point in the requirements of the topic is included in the writing. (For example, when writing On Attending Your Classes Regularly, focus on the second and third paragraphs)
29. In the process of writing, I will pay attention to whether the thesis and the topic sentence of each paragraph are clear.
30. When writing, I will pay attention to the overall layout structure of the article, so that the paragraphs are clear, and the main points are clear.
31. I made a writing plan for myself. I should often practice English writing, such as writing a composition every week.
32. I usually learn or see good vocabulary, sentence structure, etc., copied in the notebook, and used in writing.
33. I will set long-term or short-term writing goals for myself, such as improving my writing skills in one semester and passing CET-4 / CET-6.
34. usually I will give myself some opportunities to practice writing in English, such as writing diaries/weekly notes in English, correspondence with friends, participating in essay contests, speech contests and so on.
35. When writing compositions, I consciously pay attention to my use of spelling, punctuation, grammar, vocabulary, structure and so on.

Part E. Emotion strategy

36. When I feel nervous, tired or unable to write in writing, I will relax and adjust the mood by closing my eyes, deep breathing, meditation, listening to music, telling jokes, watching humorous stories, etc., to reduce anxiety.
37. Before and during writing, I will say some self-encouragement or praise, such as "It doesn't matter, wrong is wrong, everyone can make mistakes", "I am sure to write a composition on this topic", "this phrase is good", "I wrote a good composition this time" and so on.
38. When I finish a composition or when my composition is praised by the teacher, I will go to watch TV or movies, go shopping or surf the Internet to reward myself.
39. I will tell my attitude, feelings and feelings about English writing to my classmates, friends or teachers.
40. Do you set specific emotional goals before writing, such as staying positive or boosting your self-confidence?
41. Do you set yourself emotional rewards during the writing process, such as taking a break after completing a session or engaging in some recreational activity?
42. How much do you think the emotional support from your classmates has influenced your writing process?

Part F. Social strategy

43. I will write the composition to the teacher for correction.
44. I won't hand in my composition to the teacher for correction.
45. In writing, I will write "Do you think so?" "Do you agree with me?" "Work hard! You will be successful "and other thoughts and feelings of the reader exchange.
46. Do you think that participating in group writing activities can improve your creativity and writing inspiration?
47. Are you willing to share your first draft with others when working on a writing assignment?
48. How much do you think peer review has helped you improve your writing?
49. Do you use online forums or social media platforms to discuss with others or ask for help while writing?
50. What role do you usually take on a team writing project?