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Implementation of Self-regulated Learning Writing Module: Amplifying Motivation and Mitigating Anxiety among EFL Learners

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ABSTRACT

EFL learners often face difficulties in their writing performance, motivation, and writing anxiety when engaging in the writing process. To address these issues, a Self-regulated Learning Writing Module (SRLWM) was developed to assist EFL learners in their writing tasks. The main objective of this research was to evaluate the effectiveness of the SRLWM on the writing performance, anxiety levels, and motivation of college-level EFL learners. The study involved a total of 70 EFL learners from a university in Henan Province, China, and utilized a quasi-experimental design with an experimental SRLWM group and a control group. The participants underwent eight weeks of SRLWM training. Pretests and posttests were conducted to assess the participants' writing performance, motivation, and writing anxiety, and the data were analyzed using a two-way repeated measures ANOVA and Mann-Whitney U test. The results revealed a significant improvement in both writing performance and motivation among the participants in the SRLWM group, accompanied by a notable decrease in writing anxiety. These improvements were considerably different from the outcomes observed in the control group. Based on these findings, it can be concluded that SRL is an effective tool for EFL writing instruction. Consequently, the integration of SRLWM into EFL writing classes can be highly beneficial. Further research in this area could focus on dynamically tracking learners' progress in writing, as well as their levels of writing anxiety and motivation, by employing action research methodologies.

Keywords: Anxiety; EFL Learners; Literacy; Motivation; Writing Self-Regulation; Social Inclusion; Sustainability

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1. Introduction

Writing is recognized as a particularly complex skill for EFL learners, surpassing other language skills in difficulty, as it requires structuring ideas logically and accurately to create well-organized compositions (Quvanch and Si Na, 2022). Writing is a process, necessitating active idea generation, information organization across various genres, and continuous text revision (Chen, 2022; Graham et al., 2017). Mastery in structure, content, mechanics, and organization is crucial for effective writing (Zabihi et al., 2019).

However, many EFL learners experienced challenges in developing their writing performance (Syam, 2020). EFL learners demonstrated a limited understanding of specific writing genres, which affected their ability to craft effective writing in response to a text-dependent prompt. They experienced difficulties in organizing their thoughts and ideas (Aldabbus and Almansouri, 2022) and in identifying relevant information (Bisriyah, 2022). Additionally, they lacked the necessary English language proficiency (Rashid et al., 2021). Difficulties may be the result of teaching materials that do not meet learner needs (Sumarsono et al., 2017).

EFL learners also exhibited a lack of self-regulated learning strategies during writing process (Teng et al., 2022). They lacked an understanding of the different stages in the writing process, including planning, drafting, revising, and editing (Siregar et al., 2022). Consequently, they faced difficulties in establishing clear and well-defined writing goals, and in understanding the task value, despite its role as a stimulant for writing behaviors (Shen et al., 2020). Additionally, EFL learners did not engage in any self-monitoring of their writing (Bai et al., 2022; Vattøy and Gamlem, 2023). This absence of self-monitoring hindered their ability to optimize the writing process and enhance their skills. By failing to keep track of these critical aspects, they limited their potential for growth and improvement in writing in English across genres.

As a result, EFL learners' motivation for writing often stemmed not from intrinsic factors such as

personal satisfaction or enjoyment (Listyani, 2022), but from external sources like rewards or pressure from tests (Khodi et al., 2021). Meanwhile, they felt overwhelmed and anxious when required to collate and incorporate multiple perspectives into their writing (Teng, 2020).

Thus, a self-related learning writing module (SRLWM) (Sun and Motevalli, 2023) has been developed to enhance SRL among EFL learners and improve their writing performance, a key component in language mastery. This enhancement, in turn, can lead to reduced level of writing anxiety and increased level of motivation. EFL Learners' engagement as the writing productivity, enthusiasm as self-expressed motivation to write as well as initiative for writing can be mobilized and maintained for a long time. The objective of the study is to assess the effectiveness of SRLWM on Chinese EFL college learners' writing performance, motivation and writing anxiety according to self-reports.

Research hypotheses are constructed based on the implementation of SRLWM. Regarding the quasi-experiment conducted between SRLWM group and control group, pre-tests and post-tests were conducted in the areas of writing performance, motivation and writing anxiety.

2. Literature review

2.1 Theoretical framework

Within the Chinese context, English as a foreign language (EFL) writing research mainly centered on cognitive strategies, overlooking the comprehensive structure of writing strategies inherent in the SRL framework (Liu and Zhong, 2022). This highlighted the necessity to cultivate SRL strategies (Teng, 2022c).

Zimmerman (2000)'s SRL model is noted as a recurring self-regulatory phase with forethought phase, performance phase and self-reflection phase. Contrary to Zimmerman's Cyclic model, there is no typical cycle in Winne's (2002) model. Pintrich (2000), on the other hand, proposed a four phases framework of goal setting, monitoring, control and

regulation processes (Khodi, 2021). The SRL process of SRLWM integrated the three models together, adopting Zimmerman’s SRL phases as the primary stages, incorporating Winne’s non-cyclic concept, and embedding Pintrich’s stages as sub-stages. This resulted in the SRL process of SRLWM (see **Figure 1**). The SRL process was integrated with the writing process delineated by Hayes and Flower (1981).

According to Hayes and Flower, the pre-writing phase was characterized by learners collecting writing resources, examining sample essays, and setting clear writing goals. During the writing phase, learners struggled with the tasks of translating their ideas into text while monitoring the process. Subsequently, in the post-writing phase, learners indulged in thorough revisions of their work.

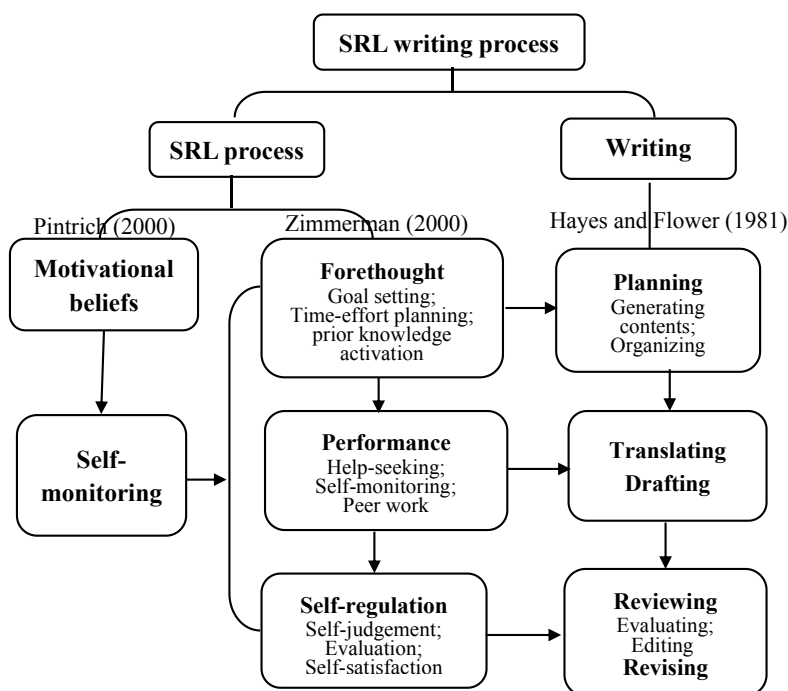


Figure 1. Theoretical framework of SRLWM.

In China, studies explored the SRL strategies employed by Chinese EFL learners. The results support the validity of the SRL model focusing on cognition, metacognition, social behavior, and motivational regulation (Teng and Zhang, 2016a, 2016b; Wang et al., 2023). Self-regulation has been identified as a multifaceted construct with significant implications for the writing performance of EFL learners (Teng and Huang, 2019). The findings also revealed that SRL factors, such as goal-oriented monitoring, peer learning, and idea planning, significantly impact writing performance (Teng and Zhang, 2016a). Shen (2024) further confirmed the positive impact of SRL strategies on EFL writing performance, with motivational regulation strategies playing a key role.

The integration of the self-regulated learning model has been a recurring theme in China’s educational landscape. Previous studies have demonstrated the effectiveness of SRL approaches in enhancing Chinese learners’ writing performance and reducing their writing anxiety. For instance, Wang et al., (2024) found that Positive emotions were found to partially mediate the relationship between learners’ ideal L2 writing selves and their engagement in self-regulated learning. However, while these studies have provided valuable insights, they have primarily focused on the macro-level effects of SRL, leaving limited attention to the nuanced, dynamic interplay between the various dimensions of SRL and their specific roles in influencing writing outcomes.

2.2 SRL with motivation

EFL writing motivation greatly impacts learners' writing, writing process, and performance (Camacho, 2021). Writing motivation affects learning and performance of writing from the following four aspects: it increases learners' energy and writing activity level, guides a learner to achieve a specific writing goal, promotes the beginning and continuation of writing activities, affects learners' writing learning strategies and cognitive processes (Wang, et al., 2024).

Most studies measure motivation in EFL writing with questionnaires, such as Questionnaire on motivation in English writing (Bruning et al., 2013), writing motivation scale (Waller and Papi, 2017) and the Writing Motivation Questionnaire (Graham et al., 2022). In the context of SRL, the Motivated Strategies for Learning Questionnaire (MSLQ) has been widely used to measure motivational constructs in EFL writing (Shen and Bai, 2024; Teng and Zhang, 2018). Results showed that motivation was positively correlated with SRL strategy use, and writing proficiency (Sun and Wang, 2020), yet negatively correlated with stress (Sulaiman et al., 2021). Motivation affected learners' behavior by influencing their choices, efforts, and obstacles encountered. Studies also showed that formative assessment promoted SRL, learning goals, and motivation (Alavi, et al., 2023). In writing, highly motivated learners adopted strategies such as summarizing main ideas to make them work harder (Nückles et al., 2020; Sun and Wang, 2020).

2.3 EFL learners' writing anxiety

Learners prone to anxiety traits hold more negative attitudes in EFL writing, which hinders the smooth progress of the writing process, leading to writing difficulties, creating painful and negative emotional experiences, and reducing their expectation of writing success (Ma and Dong, 2018). As writing anxiety has a significant negative impact on EFL learners' writing performance and achievement (Khodi et al., 2022; Rasuan and Wati,

2021), effective strategies and methods should be adopted to stimulate EFL learners' writing interest and internal motivation, enhance their writing confidence and self-efficacy, to effectively alleviate the anxiety they experience in the writing process and help them improve their English writing ability and achievement (Sun and Fan, 2022; Wang and Zhan, 2020). It's necessary to guide EFL learners with high writing anxiety to reduce their excessive concern about language errors and the expectation of writing failure. Writing anxiety may manifest as hesitation and increased latency, where the learner takes longer to initiate the writing task after it has been assigned, accompanied by negative self-talk reflecting their lack of confidence in their writing abilities (Deng, et al., 2022; Ka-kan-dee, et al., 2018; Wang, et al., 2015). The integration of Zimmerman and Pintrich's SRL models corresponds to the Process Writing method introduced by Hayes and Flower (1981). Furthermore, there's an emphasized need to foster learners' intrinsic motivation and address concerns related to the writing process. From this, the three hypotheses were generated as follows:

H01: There is no significant difference among the mean scores writing performance between SRLWM group and control group across pre and post-tests among Chinese EFL college learners.

H02: There is no significant difference among the mean scores of motivation in SRLWM group and control group across pre and post-tests among Chinese EFL college learners.

H03: There is no significant difference among the mean scores of writing anxiety in SRLWM and control group across pre, post-tests among Chinese EFL college learners.

3. Research methods

3.1 Research design

The researcher conducted an 8-week quasi-experiment (1-week for introduction and conducting the pre-test, 6-week for the training, 1-week for conclusion and administrating the post-test) in a University in Henan province in China (see **Table 1**).

Table 1. Quasi-experimental design pre-test and post-test with the control group.

Group	Pre-test	Training	Post-test
E	T ₁	X	T ₂
C	T ₁	-	T ₂

Note:

E: Experimental SRLWM Group

C: Control Group

T₁: Pre-test (writing composition, MSLQ, SLWAI)

T₂: Pre-test (writing composition, MSLQ, SLWAI)

X: (SRLWM:8 sessions×90 minutes)

—: No training

As illustrated in **Table 1**, there were two groups in this research: the Experimental Group (E) and the Control Group (C). The table outlined the structure of the research design, including the pre-tests, training sessions, and post-tests. The Experimental Group (E) was exposed to the independent variable or treatment, denoted as X. In this case, X represents the SRLWM training, consisting of 8 sessions, each lasting 90 minutes. The Control Group (C), on the other hand, did not receive this training, indicated by a dash (—).

T1 refers to the pre-test phase, involving assessments of writing composition, the Motivated Strategies for Learning Questionnaire (MSLQ), and the Second Language Writing Anxiety Inventory (SLWAI), which were administered to both groups. T2 represents the post-test phase, where the same assessments – writing composition, MSLQ, and SLWAI – were conducted again to measure the impact of the treatment. The E group underwent the SRLWM training and was then assessed, while the C group did not receive any specific training but was still assessed at the same intervals to compare the effects of the SRLWM training on the E group.

Quantitative data collected from a pre-test and post-test on English writing (for writing performance), MSLQ (for motivation), and SLWAI (for writing anxiety) collected from both SRLWM group and control group to determine the effectiveness of the SRLWM. Concurrently, profiles, including the scores of each practice for the SRLWM group, were collected to observe the dynamic changes in their writing performance.

3.2 Sampling methods

In quasi-experiment, the most common manner is matching where a control group is assigned amid the non-treated population who share identical features as the experimental group. Thus, participants were 70 EFL college learners enrolled in 2022, who were selected in purposive sampling technique, a non-probability of sampling, due to the ready availability of data. The inclusion and exclusion criteria are shown in **Table 2**.

Table 2. The inclusion and exclusion criteria for learner participants.

Inclusion criteria	Exclusion criteria
1. EFL learners enrolled in 2022, freshmen in college	1. Prior English learning experience less than 6 years
2. EFL learners facing an upcoming national English test	2. EFL learners with advanced proficiency in English writing
3. EFL learners experiencing writing anxiety	3. EFL learners with high intrinsic motivation
4. EFL learners willing to engage with the SRL module	4. Learners unwilling to participant or persist
5. EFL learners available to attend all sessions and fulfilling the requirements of the study	5. Learners with more than 3 sessions absence

3.3 Participants

Participants were recruited on a voluntary basis, and they were informed of their rights to withdraw from the research at any time during or after the data collection. They were assured that there was no evaluation of their academic performance and participation or non-participation in the study did not influence their grades. All participants were informed of their rights to withdraw from the research at any time during or after the data collection. All the participants were also assured that their grades and academic performance would not be influenced by or affected by the participation or non-participation in the research.

All participants had acquired proficiency in English writing prior to enrolling in university, with an average of 7 years of English language learning experience. (Clarify by rewording slightly. Is it that

all participants demonstrated English proficiency prior to their enrollment in university coursework.). One Reason for involving the freshmen learners is that they are mostly in need of cultivating SRL strategies as it is their first year to learn English under the guidance of an instructor at university, and they are supposed to learn English completely independently two years later. Another reason is that learners at this level will face a national English test for college learners then they have the need to assume individual responsibility towards their learning process and goal.

Participants are divided into two parallel group basic statistics of the two groups are shown in **Table 3**. In terms of age, gender, place of birth and English background, the two groups had no significant difference. The two groups were matched in terms of age, gender distribution, and pre-existing English proficiency. The SRLWM group was exposed to a 8-week SRL writing module. In contrast, the control group continued with the traditional curriculum without SRL trainings. To be specific, the timeline of the experiment spanned eight weeks: one week for the pre-test, six weeks for the sub-modules (one week for each), and one week for the post-test.

Table 3 Descriptive Statistics for SRLWM group and control group.

	GROUP	N	Mean	SD	Sig
Age	SRLWM group	35	18.06	0.73	0.51
	control group	35	17.94	0.73	
English Score of Entrance Exam	SRLWM group	35	111.29	8.75	0.86
	control group	35	111.66	8.64	
Place of birth	SRLWM group	35	2.60	0.65	0.59
	control group	35	2.51	0.66	
Gender	SRLWM group	35	1.51	0.51	0.68
	control group	35	1.46	0.51	

3.4 Instruments

Writing test

The study applied the writing test from College English Test (a national test in China) as the instrument to assess EFL learners' writing performance. The composition profile was adopted as the criteria for

assessing learners' writing performance. The rubric aims to assess five dimensions of writing performance and assigns different weights to each dimension: Content (30%), Organization (20%), Language (25%), Vocabulary (20%), and Mechanics (5%), allocating scores and levels ranging from "excellent to very good" to "very poor", each level characterized by specific criteria. This is an established analytical scoring criterion in EFL writing research and has been extensively used globally to evaluate the writing proficiency levels of L2 learners, as it provides a comprehensive analysis of learners' writing abilities, identifying areas of strength (Teng and Zhang, 2016b; Zhang and Zhang, 2023).

The Motivated Strategies for Learning Questionnaire (MSLQ)

MSLQ (Pintrich, 1991) was adapted to measure learners' motivation and related learning strategies in SRL. The MSLQ scale exhibits strong internal consistency, with Cronbach's alpha values 0.52 and 0.93. This scale displays significant predictive validity and maintains a moderate correlation with final performance, demonstrating reasonable factor validity. Given its reliability and validity, the MSLQ scale is extensively used in the motivation field of SRL (Han et al., 2021; Teng, 2021). For this research, the scale selected consists of 26 items of 2 types of motivation components. The value component consists of three dimensions: internal goal orientation, external goal orientation and task value perception. Expectancy component includes control of learning beliefs and self-efficacy for learning and performance, with 4 items and 8 items, respectively. All items were scored using a seven-point Likert scale ranging from 1 for "not at all true of me" to 7 for "very true of me".

The Second Language Writing Anxiety Inventory (SLWAI)

SLWAI (Cheng, 2004) was adopted to measure the levels of anxiety experienced during second language writing. This inventory consists of a final version of 22 structured items divided into three subscales, rated on a 5-point Likert scale. The

Somatic Anxiety subscale, focusing on physiological arousal, incorporates seven items. The Avoidance Behavior subscale explores avoidance tendencies through seven items, and the Cognitive Anxiety subscale examines fear and worry associated with L2 writing with eight items. Within the SLWAI, seven items are negatively worded and require reverse scoring before the computation of total scores. The Cronbach's alpha for the SLWAI is 0.91. It also showed adequate convergent and discriminant validity along with satisfactory criterion-related validity. It is a widely used tool to investigate writing anxiety in L2 and EFL domains (Mojdehi and Zarei, 2023; Sun and Fan, 2022).

3.5 Data collection and analysis

Participants of two groups were required to take part in the pre-test for their writing, their motivation and writing anxiety before training. Therefore, both groups were given the same writing topic (the topic was randomly selected from the College English Test Band 4). The quasi-experiment evaluating the effectiveness of the SRLWM spanned over an 8-week period, with each week dedicated to a specific sub-module of the SRLWM with 2 credit hours. The quasi-experiment evaluating the effectiveness of the SRLWM spanned over an 8-week period, with each week dedicated to a specific sub-module of

the SRLWM with 2 credit hours. Participants of two groups were required to take part in the pre-test in the first week and the post test in the last week for their writing, motivation and writing anxiety (the process refer to **Figure 2**). During the training, participants in the experimental SRLWM group were provided with structured resources tailored to five genres of writing (i.e., informative writing, problem-solving writing, compare-contrast writing, persuasive writing, and narrative writing), along with scaffolding tools including worksheets, organizers, checklists, and revising plans. The objectives of the module encompassed understanding genre structure, applying SRL strategies, revising content and language, reflecting on motivation, and managing anxiety. To ensure fidelity, instructors provided clear introduction of SRL strategies, followed by opportunities for active participation and practice. Participants received ongoing guidance and support throughout the module to scaffold their writing, and they received feedback from their peers regularly to motivate them and alleviate their anxiety. During the period, participants were asked to submit their worksheet for each writing task to get their writing portfolios. In contrast, the control group continued with the traditional curriculum without SRL trainings. Writing tests were reviewed by two experience English instructors, and the final score is the average value given by them.

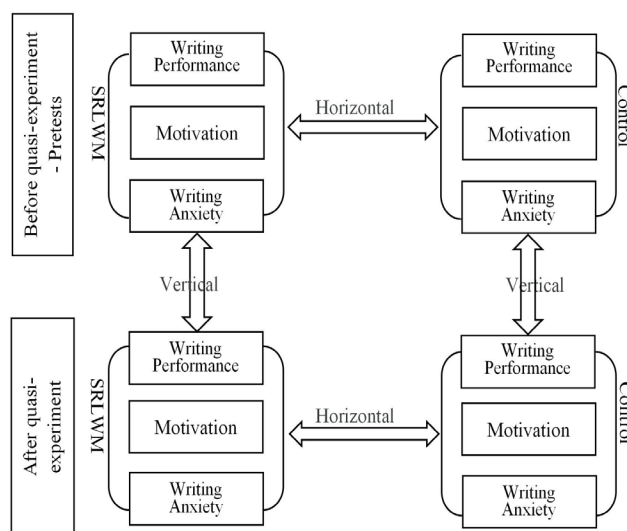


Figure 2 The process of quasi-experiment.

Using SPSS (22), ANOVA analysis was conducted on indicators or dimensions that met the normal distribution and homogeneity of variances in the pre-tests. For indicators or dimensions that did not meet the normal distribution criteria, Chi-square test was employed. A repeated measures ANOVA analysis was conducted on indicators or dimensions that met the normal distribution and homogeneity of variances in both pre-tests and post-tests. Indicators or dimensions that did not adhere to normal distribution and homogeneity of variance were assessed using the Mann-Whitney U test in the post test.

4. Results

4.1 Results in pre-tests

Results of Writing Performance in the pre-tests

The results of the Shapiro-Wilk normality test and the Levene's Test suggested that in the pre-test of writing performance for both groups, Content, Organization,

Vocabulary, Language Use, and Total scores had met the assumption of variance analysis. However, variance analysis cannot be applied to Mechanics, as the p value of Mechanics is less than 0.01.

The ANOVA results indicated no significant statistical difference between the average scores of the SRLWM and control groups, yielding an p-value of 0.94, 0.11, 0.32, 0.33, 0.86, respectively (see **Table 4**). The η^2 value ranges from < 0.01 to 0.04, indicating small effect size.

Chi-square test was used to compare the Mechanic scores of the two groups. The chi-square value was 89.57, degrees of freedom were 4, and p-value was less than 0.01. It indicated that there was no significant difference in the Mechanic scores between the two groups.

The results suggest that the initial conditions among the two study groups are homogeneous. As a result, any post-test differences can likely be attributed to the effects of the training, rather than any initial differences between the groups.

Table 4. ANOVA Table for pre-test scores of writing performance.

Indicators	Groups	n	M	SD	F	Sig.	η^2
Content	SRLWM	35	24.21	1.75	0.01	0.94	<0.01
	Control	35	24.24	1.61			
Organization	SRLWM	35	16.00	1.15	2.58	0.11	0.04
	Control	35	15.57	1.08			
Vocabulary	SRLWM	35	15.71	1.02	1.00	0.32	0.01
	Control	35	15.46	1.13			
Language Use	SRLWM	35	18.94	1.51	0.98	0.33	0.01
	Control	35	19.29	1.39			
Total	SRLWM	35	79.37	4.92	0.03	0.86	<0.01
	Control	35	79.16	4.95			

Results of motivation in the pre-test

The results of the Shapiro-Wilk normality test and the Levene's Test suggested that in the pre-test of motivation for both groups simultaneously met the criteria for normal distribution and homogeneity of variance, making it suitable for analysis using variance analysis.

The ANOVA results for the pre-test score of motivation demonstrated that there were no significant difference between the average scores of the SRLWM and control groups in five indicators of

motivation, with p-values ranging from 0.27 to 0.58 (see **Table 5**). The η^2 value ranges from 0.01 to 0.02, indicating small effect size.

ANOVA results indicated no significant statistical differences between the SRLWM and control groups across all motivation dimensions, suggesting that the initial conditions among the two study groups were homogeneous. Consequently, any differences observed in the post-test can likely be ascribed to the influence of the training, rather than inherent differences between the groups.

Table 5. ANOVA table for pre-test scores of motivation.

Dimensions	Groups	n	M	SD	F	Sig.	η^2
internal goal orientation	SRLWM	35	4.21	0.78	1.24	0.27	0.02
	Control	35	4.44	0.93			
external goal orientation	SRLWM	35	3.99	0.86	0.76	0.39	0.01
	Control	35	4.16	0.69			
task value perception	SRLWM	35	4.16	0.94	0.56	0.46	0.01
	Control	35	4.21	0.82			
learning beliefs	SRLWM	35	4.41	0.89	0.46	0.50	0.01
	Control	35	4.56	0.97			
self-efficacy for learning and performance	SRLWM	35	4.32	0.70	0.31	0.58	0.01
	Control	35	4.41	0.65			

Results of writing anxiety in the pre-test between SRLWM and control groups

The results of normality test and the Levene’s Test results for the pre-test of writing anxiety suggested that the pre-test data for the writing anxiety in the two groups simultaneously met the assumption of variance analysis.

The ANOVA findings indicated that there were no significant statistical differences between the SRLWM and control groups in average scores

concerning somatic anxiety, avoidance behavior, and cognitive anxiety (see **Table 6**), yielded p-values of 0.51, 0.42, and 0.81, respectively. The η^2 was 0.01, 0.01 and <0.01, which indicated small effect size.

These results suggest that the initial conditions of writing anxiety for both groups in the study were quite comparable. Thus, any variations identified in the post-test scores are more likely due to the impact of the training rather than intrinsic differences between the groups.

Table 6. ANOVA table for pre-test scores of writing anxiety.

Dimensions	Groups	n	M	SD	F	Sig.	η^2
Somatic anxiety	SRLWM	35	4.03	0.22	0.43	0.51	0.01
	Control	35	4.07	0.20			
Avoidance behavior	SRLWM	35	4.02	0.20	0.65	0.42	0.01
	Control	35	4.06	0.22			
Cognitive anxiety	SRLWM	35	4.17	0.30	0.06	0.81	<0.01
	Control	35	4.19	0.36			

4.2 Hypothesis testing

The results of normality test results and the Levene’s Test indicated that in the post-test of writing performance, the indicators of Content, Organization, Vocabulary, Language Use, and Total scores satisfied the assumption of repeated-measures ANOVA, whereas the indicator of Mechanics did not satisfy the normal distribution criteria. In the post-test, all dimensions of motivation and writing anxiety met the criteria for both normal distribution

and homogeneity of variance.

H01: There is no significant difference among the mean scores writing performance between SRLWM group and control group across pre and post tests among Chinese EFL college learners.

A repeated-measures analysis of variance was applied as the results of Content, Organization, Vocabulary, Language use and Total scores of writing performance in pre and post-tests. Results showcased in **Table 7**.

Table 7. Repeated measure ANOVA for writing performance.

Indicators	Effects	Source	Sum of Squares	df	Mean Square	F	Sig.
Content	Within-subjects	Content	63.11	1	63.11	41.62	< 0.01
		Content * Group	36.01	1	36.01	23.74	< 0.01
		Error	103.13	68	1.52		
	Between-subjects	Intercept	86801.40	1	86801.40	38492.14	< 0.01
		GROUP	34.01	1	34.01	15.08	< 0.01
		Error	153.34	68	2.26		
Organization	Within-subjects	Organization	6.22	1	6.22	7.45	0.01
		Organization * Group	26.15	1	26.15	31.32	< 0.01
		Error	56.76	68	.84		
	Between-subjects	Intercept	35824.00	1	35824.00	32645.21	< 0.01
		GROUP	58.50	1	58.50	53.31	< 0.01
		Error	74.62	68	1.08		
Vocabulary	Within-subjects	Vocabulary	20.45	1	20.45	31.00	< 0.01
		Vocabulary * Group	7.09	1	7.09	10.75	< 0.01
		Error	44.84	68	.66		
	Between-subjects	Intercept	35696.15	1	35696.15	29882.81	< 0.01
		GROUP	17.50	1	17.50	14.65	< 0.01
		Error	81.23	68	1.20		
Language Use	Within-subjects	Language Use	85.64	1	85.65	77.05	< 0.01
		Language Use * Group	39.64	1	39.65	35.67	< 0.01
		Error	75.59	68	1.11		
	Between-subjects	Intercept	55421.50	1	55421.50	26793.25	< 0.01
		GROUP	18.22	1	18.22	8.81	< 0.01
		Error	140.66	68	2.07		
Total score	Within-subjects	Total	640.72	1	640.72	58.41	< 0.01
		Total * Group	434.02	1	434.02	39.57	< 0.01
		Error	745.89	68	10.97		
	Between-subjects	Intercept	927715.80	1	927715.80	40781.92	< 0.01
		GROUP	488.45	1	488.45	21.47	< 0.01
		Error	1546.88	68	22.75		

In the analysis of the two-way repeated measures ANOVA for writing performance, significant differences were observed across indicators. In “Within-subjects” analysis, there was a considerable variation in scores ($F = 41.62, p < 0.01$) for Content. This variation was further emphasized by the interaction between Content and GROUP ($F = 23.74, p < 0.01$). Similarly, in Organization, notable differences were evident ($F = 7.45, p = 0.01$), with the interaction between Organization and GROUP being significantly distinct ($F = 31.32, p < 0.01$). This suggested that the group factor significantly impacted organizational aspects of writing. Vocabulary usage showed substantial differences ($F = 31.00, p < 0.01$), with the interaction of Vocabulary and GROUP highlighting further variance ($F = 10.75, p < 0.01$). Language Use presented a distinct difference ($F = 77.05, p < 0.01$), which was more pronounced when considering the interaction with GROUP ($F = 35.67, p < 0.01$). The overall Total score also indicated significant variability ($F = 58.41, p < 0.01$), with the GROUP interaction further amplifying this discrepancy ($F = 39.57, p < 0.01$).

In the “Between-subjects” analysis, significant differences in writing performance were observed across various indicators. For Content, the Intercept indicated a highly significant effect ($F = 38492.14, p < 0.01$), suggesting a strong difference in content quality, further emphasized by a significant GROUP effect ($F = 15.08, p < 0.01$), indicating meaningful differences between groups. Similarly, Organization demonstrated a significant difference (Intercept $F = 32645.21, p < 0.01$), with the GROUP effect ($F = 53.31, p < 0.01$) suggesting notable differences in organizational skills across groups. Vocabulary also showed a strong variance ($F = 29882.81, p < 0.01$), with significant differences between groups ($F = 14.65, p < 0.01$). Language Use displayed a significant difference (Intercept $F = 26793.25, p < 0.01$), with the GROUP effect indicating differences

in language quality ($F = 8.81, < 0.01$). The Total score revealed a significant overall difference (Intercept $F = 40781.92, p < 0.01$) and a significant GROUP effect ($F = 21.47, p < 0.01$), showing that overall writing performance varies significantly between groups. These findings indicate that Content, Organization, Vocabulary, Language Use, and Total score exhibited significant variability across different groups, underscoring the crucial role of group factors in influencing writing performance.

The Mann-Whitney U Test was employed to compare the post-test Mechanics scores. Results was viewed in **Table 8**. With p-values was more than 0.05, there was no significant difference in mechanics scores between the two groups in the post-test.

Table 8. Mann-Whitney U Test of Mechanic in post-test.

Total N	Mann-Whitney U	Wilcoxon W	Standard Error	P
70	583.00	1213.00	71.04	0.68

The null hypothesis is rejected for the indicators of content, organization, vocabulary, and language use, mechanics and total scores demonstrated by the distinct differences between the SRLWM and control groups in post-test.

Thus, the null hypothesis is rejected.

H02: There is no significant difference among the mean scores of motivation in SRLWM group and control group across pre and post tests Chinese EFL college learners.

A repeated-measures ANOVA was conducted to determine the differences in the differences in motivational constructs of learning internal goal orientation, external goal orientation, task value perception, learning beliefs, and self-efficacy for learning and performance- as well as their interactions with GROUP. The results indicated significant variations across all factors studied (refer to **Table 9**).

Table 9. Two-way Repeated measure ANOVA for motivation.

Dimensions	Effects	Source	Sum of Squares	df	Mean Square	F	Sig.
internal goal orientation	Within-subjects	Internal goal	23.41	1	23.41	50.03	< 0.01
		Internal goal * Group	13.99	1	13.99	29.89	< 0.01
		Error	31.82	68	0.47		
	Between-subjects	Intercept	3132.68	1	3132.68	4012.53	< 0.01
		GROUP	5.70	1	5.70	7.30	0.01
		Error	53.09	68	0.78		
external goal orientation	Within-subjects	External goal	23.00	1	23.00	67.58	< 0.01
		External goal * Group	8.38	1	8.38	24.61	< 0.01
		Error	23.15	68	0.34		
	Between-subjects	Intercept	2814.79	1	2814.79	3225.90	< 0.01
		GROUP	3.54	1	3.54	4.05	0.05
		Error	59.33	68	0.87		
task value perception	Within-subjects	Task value	31.50	1	31.50	98.99	< 0.01
		Task value * Group	9.61	1	9.61	30.18	< 0.01
		Error	21.64	68	0.32		
	Between-subjects	Intercept	3146.13	1	3146.13	9106.24	< 0.01
		GROUP	5.88	1	5.88	17.02	< 0.01
		Error	23.49	68	0.35		
learning beliefs	Within-subjects	Learning beliefs	27.46	1	27.46	53.15	< 0.01
		Learning beliefs * Group	12.60	1	12.60	24.39	< 0.01
		Error	35.13	68	0.52		
	Between-subjects	Intercept	3405.65	1	3405.65	5724.43	< 0.01
		GROUP	7.09	1	7.09	11.91	< 0.01
		Error	40.46	68	0.60		
self-efficacy for learning and performance	Within-subjects	Self-efficacy	18.11	1	18.11	73.29	< 0.01
		Self-efficacy * Group	7.95	1	7.95	32.19	< 0.01
		Error	16.80	68	0.25		
	Between-subjects	Intercept	3130.03	1	3130.03	7066.00	< 0.01
		GROUP	5.25	1	5.25	11.85	< 0.01
		Error	30.12	68	0.44		

In the analysis of the two-way repeated measures ANOVA for motivation, significant differences were observed across various dimensions. In the “Within-subjects” analysis, there were considerable variations in scores for different motivational aspects. For internal goal orientation, a significant difference was noted ($F = 50.03, p < 0.01$), with the interaction between internal goal and GROUP being significant ($F = 29.89, p < 0.01$), indicating the influence of group factors. Similarly, external goal orientation showed substantial differences ($F = 67.58, p < 0.01$),

with the interaction effect being significant ($F = 24.61, p < 0.01$). Task value perception exhibited a high degree of variability ($F = 98.99, p < 0.01$), with its interaction with GROUP also showing significant differences ($F = 30.18, p < 0.001$). Learning beliefs ($F = 53.15, p < 0.01$) and self-efficacy for learning and performance ($F = 73.29, p < 0.01$) both showed significant differences, with their interactions with GROUP being significant (Learning beliefs: $F = 24.39, p < 0.01$; Self-efficacy: $F = 32.19, p < 0.01$).

In the “Between-subjects” analysis, substantial

differences in motivational factors were observed. The Intercept for internal goal orientation indicated a highly significant effect ($F = 4012.53, p < 0.01$), with a significant GROUP effect ($F = 7.30, p = 0.01$). External goal orientation also showed a significant Intercept ($F = 3225.90, p < 0.01$) and GROUP effect ($F = 4.05, p = 0.05$). Task value perception revealed a considerable Intercept ($F = 9106.24, p < 0.01$) and GROUP effect ($F = 17.02, p < 0.01$). Learning beliefs and self-efficacy for learning and performance both demonstrated significant Intercept values (Learning beliefs: $F = 5724.43, p < 0.01$; Self-efficacy: $F = 7066.00, p < 0.01$) and GROUP effects (Learning beliefs: $F = 11.91, p < 0.01$; Self-efficacy: $F = 11.85, p < 0.01$). These results indicated that internal goal orientation, external goal orientation, task value perception, learning beliefs, and self-efficacy for learning and performance all exhibited significant

variability across different groups, emphasizing the critical role of group factors in influencing various aspects of motivation.

All five motivation measures-internal goal orientation, external goal orientation, task value perception, learning beliefs and self-efficacy for learning and performance-showed significant differences across time points and groups, leading to the rejection of the null hypotheses.

Thus, the null hypothesis is rejected.

H03: There is no significant difference among the mean scores of writing anxiety in SRLWM and control group across pre, post tests among Chinese EFL college learners.

A repeated-measures ANOVA was conducted to determine the differences in the motivational constructs of somatic anxiety, avoidance behavior, and cognitive anxiety, as well as their interactions with GROUP. The results indicated significant variations across all factors studied (refer to **Table 10**).

Table 10. Two-way Repeated measure ANOVA for writing anxiety.

Dimensions	Effects	Source	Sum of Squares	df	Mean Square	F	Sig.
Somatic anxiety	Within-subjects	Somatic	15.79	1	15.79	117.83	< 0.01
		Somatic * GROUP	6.11	1	6.11	45.62	< 0.01
		Error	9.11	68	0.13		
	Between-subjects	Intercept	1930.17	1	1930.17	14172.33	< 0.01
		GROUP	7.12	1	7.12	52.27	< 0.01
		Error	9.26	68	0.14		
Avoidance behavior	Within-subjects	Avoidance	9.51	1	9.51	113.56	< 0.01
		Avoidance * GROUP	5.62	1	5.62	67.19	< 0.01
		Error	5.69	68	0.08		
	Between-subjects	Intercept	1996.15	1	1996.15	17448.17	< 0.01
		GROUP	6.82	1	6.82	59.61	< 0.01
		Error	7.78	68	0.11		
Cognitive anxiety	Within-subjects	Cognitive	9.32	1	9.32	84.54	< 0.01
		Cognitive * GROUP	4.87	1	4.87	44.15	< 0.01
		Error	7.50	68	0.11		
	Between-subjects	Intercept	2152.47	1	2152.47	14247.61	< 0.01
		GROUP	5.37	1	5.37	35.57	< 0.01
		Error	10.27	68	0.15		

In the analysis of the two-way repeated measures ANOVA for writing anxiety, significant differences were observed across various dimensions of anxiety types. In the “Within-subjects” analysis, there was considerable variation in scores for different types of anxiety. For Somatic anxiety, a notable difference was found ($F = 117.83, p < 0.01$), and this variation was further emphasized by the interaction between Somatic anxiety and GROUP ($F = 45.62, p < 0.01$), indicating the influence of group factors on this type of anxiety. Avoidance behavior also showed substantial differences ($F = 113.56, p < 0.01$), with the interaction effect between Avoidance and GROUP being significant ($F = 67.19, p < 0.01$). Cognitive anxiety exhibited significant variability ($F = 84.54, p < 0.01$), with its interaction with GROUP also showing significant differences ($F = 44.15, p < 0.01$).

In the “Between-subjects” analysis, considerable differences in writing anxiety were observed. The Intercept for Somatic anxiety indicated a highly significant effect ($F = 14172.33, p < 0.01$), with a significant GROUP effect ($F = 52.27, p < 0.01$), suggesting meaningful differences between groups. Avoidance behavior showed a significant Intercept ($F = 17448.17, p < 0.01$) and GROUP effect ($F = 59.61, p < 0.01$). Cognitive anxiety also revealed a considerable Intercept ($F = 14247.61, p < 0.01$) and GROUP effect ($F = 35.57, p < 0.01$). These findings indicated that Somatic anxiety, Avoidance behavior, and Cognitive anxiety all exhibited significant variability across different groups, emphasizing the critical role of group factors in influencing various aspects of writing anxiety.

All three anxiety measures—somatic anxiety, avoidance behavior, and cognitive anxiety—indicated significant disparities across the time points and between groups, leading to the rejection of the null hypotheses.

Thus, the null hypothesis is rejected.

5. Discussion

5.1 Effectiveness on writing performance

The findings corresponding to the primary objective of this study offered evidence that when learners were involved in the SRLWM training,

where they were taught SRL techniques such as goal setting, planning, and self-monitoring during the writing process, there was a notable elevation in their writing performance levels.

The SRLWM training was congruent with established frameworks of SRL and writing process methodologies. It sought to improve learners’ writing capabilities by enhancing their SRL skills, such as goal setting, planning, and self-monitoring during the writing process (Teng, 2022b). This places the training in alignment with problem-focused coping strategies, as it endeavors to manage or change the challenging aspects of EFL writing. In this light, the SRLWM training can be seen as effectively aiding learners in improving their writing skills as a form of problem-focused coping, which is particularly beneficial when compared to the outcomes for the control group.

These findings are also consistent with the results of other studies that have investigated the impact of SRL Strategies-Based Writing Trainings on learners’ writing proficiency (Shen and Bai, 2024; Teng, 2022; Teng and Zhang, 2020). The self-monitoring technique led to increased levels of writing performance. Goal setting technique assisted learners in boosting their motivation, which subsequently improved their writing performance (Pham, 2023).

The consistent improvement implied that the writing performance, as measured by these indicators and dimensions, was incrementally enhanced through the training of SRLWM. These observations aligned with the findings reported by Teng (2022a), which utilized the pre-assessment, immediate post-assessment, and deferred post-assessment to evaluate writing quality in content, organization, vocabulary, language use and mechanic. Meanwhile, the inclusion of SRL strategies contributed to a clear understanding of writing processes within the SRL mechanism for improving writing performance.

5.2 Effectiveness on motivation

Learners in the SRLWM group demonstrated an enhanced aptitude for setting precise writing goals, strategizing their planning, and thoroughly evaluating their work, surpassing their counterparts

in the control group in all areas of motivation.

As SRL is characterized by the self-generated thoughts, feeling, and behaviors that are systematically adjusted to achieve individual objectives, it encompasses not only goals but also the motivational feelings or beliefs related to reaching those goals, coupled with autonomous learning activities (Zimmerman and Cleary, 2009). The theory of SRL outlines how individuals consciously harness personal, behavioral, and environmental factors. Through these elements, learners actively shape, sustain, and adjust their perceptions, motivations, and behaviors to reach the educational objectives. Within the SRL framework, learners must motivate themselves to complete their studies. They are uniquely equipped with motivational beliefs and additional cognitive strategies, making them metacognitively adept. SRL instruction in EFL writing class have been confirmed to effectively help learners to develop a higher level of motivation, in aspects of task value, extrinsic goal orientation, control of learning beliefs and self-efficacy (Teng, 2022b).

It became clear that there's a deeply inter-related relationship weaving through linguistic proficiency, SRL, and overall motivation in writing. Improvement in writing performance paved the way for effective SRL. When these two pillars are robust, they collectively uplifted the motivation in learners. Previous studies have affirmed the positive correlation of writing self-efficacy with writing performance (Ng et al., 2021; Woottipong, 2020), learner engagement (Tsao, 2021), and SRL strategies (Golparvar and Khafi, 2021; Shen and Bai, 2024; Sun and Wang, 2020; Zumbunn et al., 2020). Meanwhile, motivation is a precursor of the use of SRL strategies in affecting EFL writing performance. Not only does it have direct and indirect effects on learners' writing performance, but it is also significantly correlated with their reported use of SRL strategies related to cognitive and metacognitive strategies (Teng and Zhang, 2018).

Another important factor that prompts learners' intrinsic motivation is the collection of their writing portfolios. These portfolios targeted writing tasks and allowed learners to actively analyze, judge, and draw conclusions. This enabled self-evaluation, self-reflection, and the development of self-monitoring skills, fostering reflective thinking abilities and

enhancing SRL writing capabilities (Kouhpeyma and Kashfian-Naeeni, 2020).

5.3 Effectiveness on writing anxiety

Learners who lack a clear understanding of the writing process and its elements often grapple with crafting their compositions. This can lead to increased anxiety, given the intricate nature and requirements of writing (Quvanch and Si Na, 2022). The trends of somatic anxiety, avoidance behaviors, and cognitive anxiety changes are distinct yet intertwined in their implications in writing process. Somatic anxiety pertains to a learner's perception of the psychological effects of their experienced anxiety, underscored by Alfiansyah et al. (2017), who observed that learners, especially in high school, often succumb to panic, leaving their minds blank as they commence writing. Such anxiety becomes pronounced when these learners confront the challenge of generating ideas within limited timelines, like during timed writing assignments. Conversely, avoidance behavior, delineated by Cheng (2004), denotes the intentional avoidance of writing. This behavior is prevalent among EFL learners who often evade writing exercises or any tasks necessitating writing. This anxiety type is especially harmful, as it has a direct bearing on learners' performance in their writing courses.

The use of writing portfolio served as a testament to learners' learning processes, making evaluations more open and relevant. Such a learner-centered approach can provide significant developments in learners' mental, cognitive, and metacognitive characteristics. Learners' work highlighted their effort, progress, and achievements throughout the process, enabling learners to practice writing with a positive emotional experience. Portfolio emphasized active learning rather than passive knowledge absorption, shifting from a focus on selection to development and highlighting learners' personal value judgments (Khalilzadeh and Khodi, 2021), thereby fostering learner growth through evaluation. As a result, portfolio significantly contributed to lowering EFL learners' anxiety (Abdi, 2017).

The SRLWM group's results across all three dimensions suggested a holistic improvement in their

relationship with English writing tasks – physically feeling less anxious, mentally more at ease, and behaviorally more engaged. The control group did not showcase a similar trajectory, emphasizing the potential benefits of SRLWM for college English learners.

6. Conclusion

Beyond enhancing learners' writing abilities, SRLWM had been evidenced to alleviate learners' writing anxiety and bolster their motivation towards writing instruction. This included motivation related areas such as intrinsic and extrinsic goals, the task value perceptions, learning beliefs, and learning efficacy, and writing anxiety related areas such as somatic anxiety, avoidance behavior, cognitive anxiety. The SRLWM emerged as a practical tool that can be adapted and utilized in EFL writing instruction. It equipped instructor with an innovative, evidence-based approach to teaching EFL writing. Due of the study's duration, the long-term effects of SRLWM on motivation and writing anxiety have not been fully examined. Longer intervention periods and follow-up evaluations will provide insights on how long-lasting the impacts will be. By employing action research methods, these studies could delve deeper into understanding how motivation regulation evolves and influences learning outcomes (Li, et al., 2022; Motevalli, et al., 2023). It is recommended that SRLWM be regularly incorporated into EFL writing classes. To help learners learn to self-regulate their writing process, EFL instructors are advised to include the SRLWM into their writing instruction. For example, they explicitly provide learners with SRL strategies embedded within SRLWM, such as how to set writing goals, plan their writing tasks, monitor their progress, and reflect on their writing. Instructors can also use scaffolding techniques provided by SRLWM like checklists, graphic organizers, and peer collaboration to help learners execute SRL practices. With the use of these scaffolds, learners may better organize their ideas, monitor their development, and get peer input to improve their writing, become more motivated, and feel less anxious.

Author Contributions

Jing Sun led the study, overseeing all aspects including writing, analysis, data collection, design, and implementation. Saeid Motevalli supervised the project, conducted statistical analysis, and contributed significantly to the study's design and overall write-up. Nee Nee Chan provided supervision, conducted analysis, contributed to the manuscript's preparation, and assisted in study design. Ali Khodi focused on proofreading, writing, and revising the manuscript to ensure clarity and coherence throughout the article.

Conflict of Interest

The authors declare that there are no conflicts of interest related to this research study.

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Data Availability Statement

The data for this study will be available upon request. Please contact the corresponding author for access.

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