Self-Efficacy Based Instruction: Exploring the Correlation between Writing Self-Efficacy and Critical Thinking

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Abstract

Critical thinking serves as a pivotal gauge of learners' scholastic and professional achievements. It is recognised as an integral component of higher education, as it meets one of the educational prerequisites of this era. Learners of higher education are expected to acquire critical thinking skills, entrepreneurial skills, application skills, communication skills, presentation skills, organisational skills, cognitive skills, technology skills and digital literacy. In order to meet the educational demands of the present era, higher-education learners need to possess the ability to think critically. The current study employs self-efficacy strategies through activities namely, generating ideas (ideation), expressing ideas (conventions), managing writing (self-regulation) to foster self-efficacy in writing skills and critical thinking skills among the undergraduate learners by emphasising the association between writing and thinking. L2 Writer Self-Efficacy Scale (L2WSS) questionnaire was administered to assess the existing level of writing self-efficacy among the learners. The hypothesis formulated for this study was assessed by conducting a pre- and post-test to the samples comprising eighty-two students. The evaluation was carried out using two distinct rubrics, namely, The Criteria for Evaluating CT in L2 Writing and Rubric for grading scholarly paper assignment**.** The results revealed that the learners' Writing Self-Efficacy (WSE) and critical thinking skills were enhanced. It was observed from Pearson correlation coefficient that there was a positive relationship between WSE and critical thinking. In addition, a comprehensive qualitative analysis was conducted through interviews, which elucidated the L2 learners' positive perceptions of WSE and critical thinking.

Keywords: Writing Self-Efficacy, Critical thinking, Pearson correlation, higher education

1. Introduction

1.1 Critical Thinking (CT)

Critical Thinking (CT) is widely recognised as a fundamental aspect of higher education as it is goal-directed and reflective. It aids in the gradual advancement of learners' cognitive abilities as it become synchronised and refined over time. The process of retaining and internalising concepts presented in the classroom also demands the cultivation of critical thinking skills among the learners (Moore, 2011). The national policy documents of 152 countries inculcated skills like communication, critical thinking, creativity, and problem-solving into their teaching strategies among the learners. Countries like India, Philippines, Australia, and Kenya have promulgated curricular revisions by implementing a pedagogical strategy that reiterated the development of critical thinking abilities as one of its core policies, for instance, the Kenyan Ministry of Education, Science, and Technology (MOEST) has made a significant educational transformation in Kenya. This initiative aligns with Kenya Vision 2030 and highlights the development of 21st-century skills among learners, such as effective communication, collaborative abilities, self-efficacy, and critical thinking (Care et al., 2018). Similarly, the National Education Policy of India 2020 (NEP 2020) outlined the prospective framework for the reformation of the education system in India. The proposals unveiled by the Ministry of Human Resource Development (MHRD) are intended to effectuate a comprehensive overhaul of India's educational system by the year 2030. One of their policies specifies that the curriculum content will be reduced to facilitate the development of critical thinking skills among learners. The NEP expounds the need for the development of critical thinking abilities among undergraduate learners. It also highlights that the education system ought to give more importance to the development of higher-order cognitive abilities such as critical thinking and problem-solving, as these proficiencies foster innovation among the learners. These strategies accentuate the growth of higher education by making the learners self-dependent (Sharma, 2021). Hence, the global significance of critical thinking is pervasive.

1.2 Writing Self-Efficacy (WSE)

According to Albert Bandura (1977), self-efficacy refers to an individual's assessment of their own ability to carry out the necessary

actions to complete any task effectively. It corresponds to the learners' capacity to attain a desired outcome or a task assigned to them. Learners who possess high level of self-efficacy with regard to a specific task tend to exhibit resilience and persistence when confronted with obstacles, whereas, those with lower levels of self-efficacy for the same task, disengage or evade the circumstance. Indeed, numerous studies have revealed that self-efficacy in writing serves as a more substantial indicator of achieving a high level of writing proficiency (Blasco, 2016). The writing process facilitates the enhancement of the learners' cognitive abilities, since it serves as the foundation for various assessments, such as writing research reports, statement of proposal, marketing report, and feasibility report. The act of engaging in writing promotes the acquisition of cognitive skills, including analysis, synthesis, and inference. Hence, it is crucial to recognise the importance of writing in enhancing cognitive growth and attaining academic achievements in the realm of higher education (Bacha, 2002).

In recent years, a lot of attention has been directed towards writing practices at the graduate level across all the fields of study. Writing research proposals, research articles, and dissertations have been the most significant competencies for L2 learners in various colleges and universities (Ho, 2015). Writing Self-Efficacy (WSE) is identified as a characteristic that has a considerable impact on learners' writing performance. The three primary aspects of WSE that are crucial for the learners are linguistic self-efficacy, self-regulatory self-efficacy, and performance self-efficacy. Linguistic self-efficacy pertains to learners' assessment of their linguistic abilities, followed by self-regulatory efficacy, which relates to their perception of their ability to complete the task given and performance self-efficacy, which concerns their beliefs about their capability to complete the given writing task successfully (Teng et al., 2017).

Blasco (2016) investigated the interplay between writing self-efficacy, writing anxiety, and the utilisation of metacognitive strategies in connection to the learners' writing performance. It was observed that the usage of metacognitive strategies is positively correlated with the learners' level of English language proficiency and writing self-efficacy. The results of this case study revealed that the learners with high self-efficacy in writing performed better with confidence. Besides, the findings of the study substantiated the notion that the learners with elevated self-efficacy levels tend to exhibit reduced anxiety levels and demonstrated superior performance in the domain of English language writing.

Demirkol & Demiroz (2022) explored the correlation between WSE and English language proficiency level among English as a Foreign Language (EFL) learners. The researchers administered a questionnaire to evaluate the proficiency of the learners in their L2 writing self-efficacy. It was found that the learners made considerable progress in their English language competency and demonstrated an increasingly positive attitude towards L2 writing self-efficacy.

In spite of numerous studies that have examined the relationship between critical thinking and self-efficacy, critical thinking and argumentative writing, self-regulation strategies and writing self-efficacy, writing anxiety and writing self-efficacy, along with metacognitive strategies, WSE, and language proficiency, no study has been identified that specifically investigates the association between WSE and CT among the learners in higher education. Therefore, the aim of this study is to investigate the correlation between these two variables, and the results of this study have the potential to contribute to the scarce literature that explores the connection between the self-efficacy in writing and critical thinking skills in the English as a Second Language (ESL) context.

1.3 Research Question

RQ1: What is the competency level of the students with regard to their Writing Self-Efficacy (WSE) and writing Performance ?

RQ2: Is there any significant impact on using WSE based instruction to develop writing self-efficacy among the rural college students?

RQ3: Does the WSE based instruction foster CT among the rural college students?

RQ4: Is there any positive relationship between WSE and CT?

RQ5: What are the perceptions of the learners on developing critical thinking skills and writing self-efficacy?

2. Review of Literature

Gonzalez-Cacho & Abbas (2022) discovered a positive correlation among interactivity in writing skill, active collaborative learning, and the development of critical thinking skills. They employed social media-based activities to investigate the association between interactivity and collaborative learning with CT and reported that both variables exhibit a positive relationship in influencing the CT of the learners in higher education. In this study, the researchers wanted to find out how the various factors like co-planning, co-monitoring, co-evaluation, effort regulation, and help-seeking, affect the co-regulation strategies used by English learners, including their WSE, in a computer-mediated collaborative writing setting are interrelated. They have utilised the Brunning's et al (2013) model of writing self-efficacy which encompasses various dimensions, such as ideation, conventions, and self-regulation. It was discovered that the utilisation of co-regulation strategies within a computer-mediated collaborative writing environment has a noteworthy impact on the learners' WSE (Su et al., 2023).

Shen & Bai (2022) stated that self-efficacy is a precursor to self-regulated writing and that high-self-efficacy learners achieve challenging goals and use cognitive techniques to complete tasks. They explored how self-efficacy affects Self-Regulated Learning (SRL) strategies and writing performance. They examined how motivational regulation strategies interact with SRL strategies, such as cognitive, metacognitive, and social strategies to improve learners' writing performance. The findings of the study added to the limited body of literature on writing self-efficacy and SRL writing techniques in the context of EFL and ESL, while the SEM results showed that learners'

writing self-efficacy predicted their SRL writing methods.

Beniche (2023) examined the relationship between critical thinking skills and argumentative writing skills among higher education learners. The study evaluated the influence of CT on the proficiency of learners, especially, argumentative essays. It identified a significant positive relationship between CT and argumentative writing. It also revealed that there is an inherent connection between writing and thinking, as the writer's perception of the world is conveyed through their writing.

Bai & Guo (2018) sought to explore the effects of SRL strategies on primary school learners' WSE. They employed a survey instrument to assess the usage of the SRL strategy and WSE. It was found that the learners who used more SRL strategies reported a higher level of WSE. It was discovered that the learners' planning and self-monitoring strategies had the strongest correlations with WSE in an ESL/EFL context. Ekholm et al., (2014) analysed the learners' emotional response to the feedback they received on their writing and how their views on the feedback influenced the connection between their WSE and writing self-regulation beliefs. The findings yielded significant insights, indicating that the perceptions of writing feedback play a partial mediating role in the association between WSE and writing self-regulation beliefs. This study expanded the existing body of literature on how learners perceive feedback and demonstrated the significance of fostering learners' writing motivation.

Tsao (2021) focused on the fundamental role of writing self-efficacy in enhancing engagement of the learners with Written Corrective Feedback (WCF). The findings highlighted that the learners expressed low to moderate level of L2 writing self-efficacy. The three categories of writing self-efficacy, namely ideation, conventions, and self-regulation, were examined and it was found that writing self-regulation was the only factor that could predict learner engagement with teacher and peer WCF. Moreover, the significant discoveries enhanced the comprehension of EFL learners' L2 WSE, as well as shed light on the unexplored field of study regarding the relationship between WSE and learner engagement with WCF. Therefore, it is palpable that there is a lack of literature on WSE strategies for improving critical thinking skills among ESL learners. As a result, this hypothesis has been taken up for an investigation to ascertain whether WSE-based instruction could assist students foster their writing self-efficacy and critical thinking skills, as well as the relationship between these two variables.

2.1 Purpose of the Research

The primary objective of this research is to enhance Writing Self-Efficacy (WSE) and Critical Thinking (CT) skills among English as a Second Language (ESL) learners by implementing Writing Self-Efficacy strategies. Additionally, this study seeks to investigate the correlation between WSE and CT. The hypothesis formulated for the present study are as follows:

$H_0$1: There is no significant difference between control and experimental groups in the pre-test of WSE among the learners

$H_0$2: The WSE based instruction does not enhance the WSE of the learners

$H_0$3: There is no significant difference between control group and experimental group in the pre-test of CT among the rural college students

$H_0$4: The intervention does not foster the CT among the learners

$H_0$5: There is no positive relationship between WSE and CT

3. Methodology

3.1 Participants

The present study involved 82 first-year Arts and Science students, of whom 39 were male and 43 were female, from a rural Arts and Science college in South India. The selection procedure employed in this study was the random sampling method. They were freshmen ranging from 18 to 22 years of age and were equally divided into control group and experimental group.

3.2 Research Design

The study utilised the mixed-methods research design (Fig. 1), which is characterised by the combination of both quantitative and qualitative data analysis. After dividing the samples into the control and experimental groups, a pre-study questionnaire was administered to identify the level of WSE among the learners. Later, a pre-test was conducted for both the groups that participated in the study. Intervention was carried out for the experimental group, and a post-test was conducted for both the groups, which was followed by a post-study interview for 20 students who were interviewed based on the improvement in their CT and WSE scores.

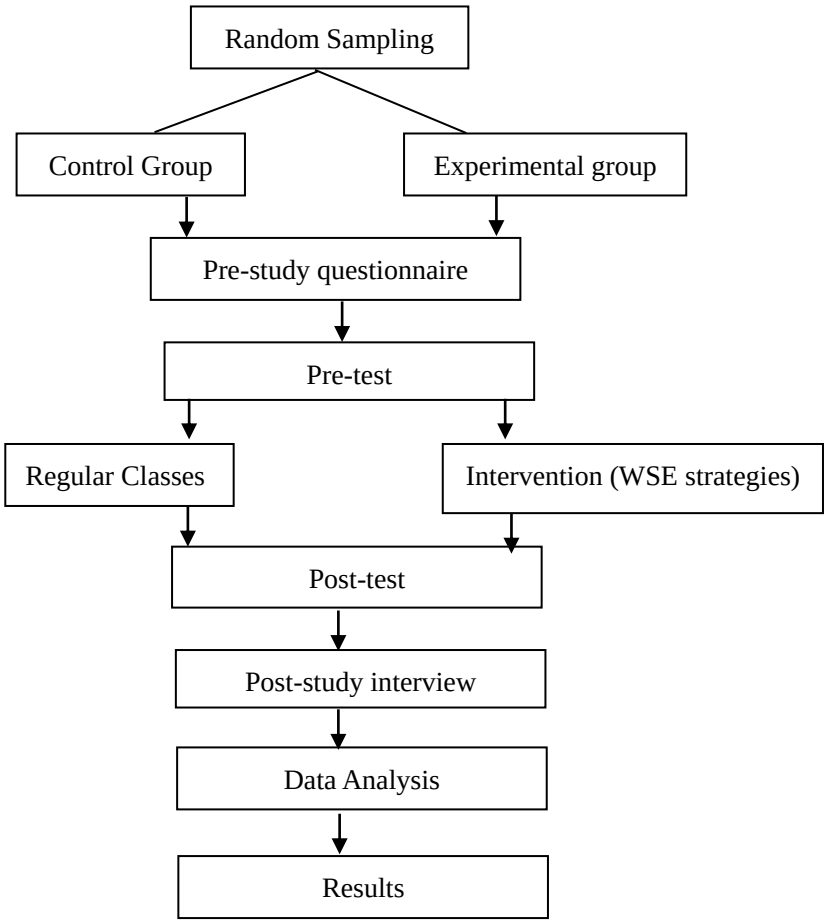

Figure 1. Research Design

3.3 Research Instruments

The research instruments used for collecting data consisted of the L2 Writer Self-Efficacy Scale (L2WSS) questionnaire (Teng et al., 2017). The pre-test and post-test assessments are followed by three open-ended interview questions to analyse the perceptions of the learners regarding critical thinking and WSE.

3.4 Research Procedure

The control and experimental groups were given a L2 Writer Self-Efficacy Scale (L2WSS) questionnaire (Teng et al., 2017) to determine their level of WSE. The pre-test and post-test essay questions given to the learners were based on the IELTS Writing Test (Task 2). The WSE strategies employed as an intervention in the experimental group enabled learners to address the problem given, defend their viewpoint, analyse and criticise their own ideas, evaluate their strengths and weaknesses in writing, and master their writing knowledge. Later, the answer scripts were evaluated using rubrics.

The primary sources utilised in the development of WSE and CT include mastery experience, vicarious experience, social persuasion, and physiological and emotional states. The use of the mastery experience technique has been demonstrated to be highly effective among the learners. It pertains to the learners' ability and confidence in solving problems using the knowledge gained from previous experiences. The learners were given prompts that require them to write answers using their previous knowledge, for instance, they were asked to write about 'Cyberbullying,' 'Food and Diet' and 'Best Birthday.' They should be able to use their prior knowledge regarding the topic and involve themselves in the activity. This develops their writing and critical thinking skills. Following this, the learners proceed to employ these interpretations as a basis for formulating self-efficacy beliefs regarding their own competence in order to indulge in future tasks given to them. The concept of vicarious experience implies the capacity to observe others' experiences and emulate them in order to perform one's own tasks, for instance, the participants observed their classmates writing as peer models and reported that the writing performance of the models positively affected their self-efficacy and increased motivation. Peer feedback and using the knowledge gained from peers enabled learners to write from different perspectives, which eventually developed their self-efficacy.

The social persuasions including verbal judgements could act as a source of self-efficacy. Persuaders like teachers and parents play an important part in the development of a learners' self-beliefs. Effective persuaders cultivate learners' beliefs in their capabilities and positive persuasions about their writing which encourages and empowers the learners' WSE. The researcher acted as a facilitator and provided feedback on their writing. The reinforcement given by the teacher developed their self-efficacy in writing. The social persuasion

exerted by learners in one's environment can potentially serve as a significant determinant of their self-efficacy beliefs. The usage of affirmative influences in relation to one's writing can potentially yield favourable outcomes in terms of fostering and enhancing their beliefs in their own writing abilities.

Physiological and emotional states also reveals the self-efficacy beliefs of the learners. When learners encounter pessimistic ideas and anxieties over their abilities, these emotional states might diminish their confidence in their own competence and provoke further anxiousness, ultimately leading to an inadequate performance. For instance, the learners were asked to plan before they start writing and to think critically to address the question given. While doing so, they experienced less anxiety while writing, which resulted in a good writing performance. Thus, the learners were able to think of the goals before writing, which reduced their anxiety in writing and made them perform better in their writing and thinking skills. These self-regulatory methods enable them to develop their self-efficacy in writing and critical thinking skills. Hence, the physiological and emotional states of learners have a substantial impact on their writing performance. Thus, the self-efficacy strategies, such as mastery experience, vicarious experience, social persuasion, and emotional states are used to cultivate the WSE and CT among L2 learners (Bandura, 1997; Pajares et al., 2007). Therefore, it is understood that the development of language and critical thinking are interrelated (Stapleton 2001). Exposing students from a rural background to these activities will lead to the development of critical thoughts in the classroom, thereby fostering the development of language and critical thinking abilities. Later, the data was analysed using the Statistical Package for the Social Sciences (SPSS) version 20, and the statistical tests performed are identified in the results section.

3.5 Data Collection

The study was carried out for 4 weeks, and shortly after, the pre-test and post-test essays of the participants were evaluated using two rubrics. The learners' level of CT was evaluated using *The Criteria for Evaluating CT in L2 Writing* (Dong, 2017) which was developed based on Paul and Elder's (2019) "Intellectual Standards". The rubric consists of nine criteria corresponding to the nine "Intellectual Standards" with 5-point Likert scale. The learners' level of WSE is assessed using *Rubric for grading scholarly paper assignment* (Mitchell, 2017). Criteria such as Introduction, Research depth, and Conclusion were taken into account to evaluate the learners' level of WSE. Furthermore, the data from the interview were recorded and transcribed, and thematic analysis and code development were carried out to interpret the findings.

4. Data Analysis

The data collected was statistically analysed using SPSS where the Kolmogorov-Smirnov data normality test was carried out to find out whether the data is normally distributed and a good fit for the parametric tests to be conducted.

Table 1. Test for normal distribution of Writing Self-Efficacy (WSE) and Critical Thinking (CT)

		Statistics	p
Writing Self-Efficacy (WSE)	Kolmogorov-Smirnov	0.087	0.190
Critical Thinking (CT)	Kolmogorov-Smirnov	0.080	0.200

The p-value of WSE and CT are above 0.05 which indicates that the data has been normally distributed and the parametric test like, paired sample tests can be done. Also, the Pearson's product-moment correlation coefficient test can be performed to measure the strength and direction of association that exists between two variables such as WSE and CT measured on an interval scale.

5. Results

5.1 Analysis of Research Question 1

RQ1: What is the competency level of the students with regard to their Writing Self-Efficacy (WSE) and writing Performance ?

The present study utilized the L2 Writer Self-Efficacy Scale (L2WSS) questionnaire developed by (Teng et al., 2017). It consists of 20 items including questions that pertain to linguistic self-efficacy, self-regulatory efficacy and performance self-efficacy. The Cronbach alpha coefficients of the questionnaire are as follows

Table 2. Cronbach alpha coefficient of the questionnaire

Constructs	Items	Cronbach Alpha Coefficient
Linguistic self-efficacy	7	0.83
Self-regulatory efficacy	6	0.81
Performance self-efficacy	7	0.85

The questionnaire served as a preliminary survey tool to evaluate the competency level of the participants in regards to their WSE and writing performance prior to the commencement of the study. It is indicated from Table 3 that the least practiced dimension of WSE is an item from the self-regulatory efficacy construct with a mean score of 1.25, followed by an item from the construct of linguistic self-efficacy with a mean score of 1.48, and another item with a mean score of 1.51 related to performance self-efficacy. There are two items with a high mean score of 5.98, which expound on the fact that the learners are at the basic stage, where they can revise only basic grammar errors and understand only the basic concepts taught in writing courses. Further, it is explicit that the learners are not able to write the answers with clarity in sentence structure while writing their assignments. They are also not able to self-evaluate their writing style after writing the assignments. Thus, it is evident that the learners lack writing self-efficacy (WSE) .

Table 3. Descriptive Analysis of the L2 Writer Self-Efficacy Scale (L2WSS) (N=82)

Items	Mean	Std. error mean	Std. Deviation
Linguistic self-efficacy			
I can correctly use parts of speech (e.g., nouns, verbs, adjectives) in writing	5.24	0.09	0.83
I can write a simple sentence with grammatical structure	5.74	0.04	0.43
I can write compound and complex sentences with grammatical structure	2.78	0.16	1.49
I can write a composition with a clear organisation or structure	1.75	0.09	0.83
I can revise wordy or confusing sentences of my writing.	1.48	0.05	0.50
I can revise my composition to make it better organized.	2.48	0.05	0.50
I can revise basic grammar errors in my writing.	5.98	0.07	0.71
Self-regulatory efficacy			
I can realise my goal to improve my writing	4.71	0.14	1.30
I can think of my goals before writing.	3.97	0.13	1.23
I can think of different ways to help me to plan before writing	3.48	0.18	1.67
I can evaluate whether I achieve my goal in writing	1.25	0.04	0.43
I can evaluate my strength and weakness in writing	4.47	0.16	1.51
I can evaluate whether a composition is good or bad	2.24	0.05	0.45
Performance self-efficacy			
I can understand the most difficult material presented in writing courses	2.01	0.07	0.71
I can understand the basic concepts taught in writing courses	5.98	0.07	0.71
I can understand the most complex material presented by the instructor of writing courses.	1.75	0.09	0.83
I can do an excellent job on the assignments in writing courses.	1.51	0.05	0.50
I can master the writing knowledge and strategies being taught in writing courses	2.23	0.09	0.83
I can use the writing knowledge and strategies being taught in writing courses	4.96	0.08	0.74
Considering the difficulty of the writing course, the teacher, and my skill, I can perform well in writing courses.	5.23	0.09	0.83

Following the analysis of the findings of the pre-study questionnaire, a pre-test was conducted to both the control and experimental groups. The answer scripts of all the learners were photocopied, and one of the copies was used to assess their WSE using the *Rubric for grading scholarly paper assignment* (Mitchell, 2017) and to evaluate their CT, another copy of the same learner was rated applying *The Criteria for Evaluating CT in L2 Writing* (Dong, 2017).

5.2 Analysis of Research Question 2

RQ2: Is there any significant impact on using WSE based instruction to develop writing self- efficacy among the rural college students?

In this study, the independent sample t-test was employed to ascertain whether there is any statistically significant difference between the control and experimental groups concerning the learners' writing self-efficacy. Table 4 displays the results of the independent t-test for the control and experimental groups in terms of WSE, where there was no significance in the pre-test data, with the control group obtaining ($M = 8.58$, $SD = 2.54$) and the experimental group yielding ($M = 8.56$, $SD = 2.51$). As there were no findings that were statistically significant, $t(80) = 0.04$, $p = 0.96$, therefore the null hypothesis was accepted.

On the contrary, the experimental group ($M = 15.31$, $SD = 2.19$) and the control group ($M = 9.85$, $SD = 1.85$) demonstrated improvement in their scores. In the post-test, the experimental group showed a significantly higher mean value than the control group, with a p-value ($p = 0.00$, $t(80) = 12.17$) less than $\alpha = 0.05$, pointing out the disparity between the scores. As a result, the null hypothesis was rejected and the alternate hypothesis was accepted suggesting that the WSE based instruction enhanced the writing self-efficacy among the learners.

Table 4. Independent sample t-test for the control and experimental groups pertaining to WSE

Group		N	Mean	Std. D	Std. error	t	df	Sig.	Mean Difference
Pre- test	Control Group	41	8.58	2.54	0.39	0.04	80	0.96	0.02
	Experimental Group	41	8.56	2.51	0.39				
Post-test	Control Group	41	9.85	1.85	0.28	12.17	80	0.00	5.46
	Experimental Group	41	15.31	2.19	0.34				

5.3 Analysis of Research Question 3

RQ3: Does the WSE based instruction foster CT among the rural college students?

The independent samples t-test was used in this study to determine the significant differences between the control and experimental group with regard to critical thinking level of the learners. Table 5 denotes the independent t-test for the control and experimental groups regarding CT, where there was no significance in the pre-test results where the control group yielded ($M = 7.75$, $SD = 2.95$) and the score of the experimental group, was observed to be ($M = 7.31$, $SD = 1.99$). This test indicated that there was no statistically significant results, $t(80) = 0.65$, $p = 0.51$, therefore the null hypothesis was accepted.

Whereas the post-test results of the control group ($M = 9.19$, $SD = 2.05$) and the experimental group ($M = 14.73$, $SD = 2.22$), showed improvement in their scores. The mean value of the experimental group was higher in the post-test when compared to the control group

where the p-value (p = 0.00, t (80) = 11.71) was less than α = 0.05, indicating a significant difference between the scores. Therefore, the null hypothesis was rejected and the alternate hypothesis was accepted proving that the WSE based instruction fostered critical thinking skills among the learners.

Table 5. Independent sample t-test for the control and experimental groups regarding CT

Group		N	Mean	Std. D	Std. error	t	df	Sig.	Mean Difference
Pre- test	Control Group	41	7.75	2.95	0.46	0.65	80	0.51	0.36
	Experimental Group	41	7.31	1.99	0.31				
Post-test	Control Group	41	9.19	2.05	0.32	11.71	80	0.00	5.53
	Experimental Group	41	14.73	2.22	0.34				

5.4 Analysis of RQ4

RQ4: Is there any positive relationship between Writing Self-Efficacy (WSE) and Critical Thinking (CT)?

Table 6. Pearson correlation between learners' WSE and CT

		Post-Test CT score	Post-Test WSE score
Post-test CT Score	Pearson correlation (r)	1	.848
	P(2-tailed)		.000
	N	82	82
Post-test WSE score	Pearson correlation (r)	.848**	1
	P(2-tailed)	.000	
	N	82	82

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

The findings of the subsequent statistical analyses indicate that the learners of the experimental group demonstrated enhancements in both their WSE and CT scores. Moreover, to highlight the relationship between WSE and CT, further investigation of the correlation between these scores is required. Therefore, Pearson's correlation was used to ascertain the association between WSE and CT. The Pearson product-moment correlation coefficient, denoted by the symbol 'r,' is a statistical measure that quantifies the correlation between two variables. The correlation coefficient of the two variables always falls within the range of -1 to +1 and it depicts the linear associations between variables, wherein it determines that high scores on one variable are likely to correspond with high scores on another one (Dornyei, 2007). The correlation between the critical thinking capacity and writing self-efficacy of the learners is evident from the data shown in Table 6. The obtained correlation coefficient (r = .848, p<0.01) suggests a highly significant and robust association between the two variables namely, WSE and CT. Thus, the null hypothesis is rejected and alternative hypothesis is accepted as there is positive relationship between the two variables. It is concluded that learners with high writing self-efficacy capability tend to become better critical thinkers.

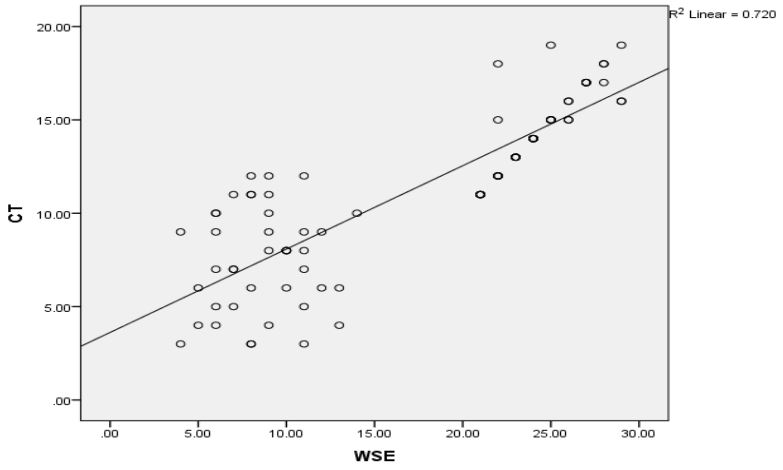

Figure 2. Scatter plot

The scatterplot displays the strength, direction, and form of the relationship between two quantitative variables, such as writing self-efficacy, and critical thinking and it highlights the correlation between two continuous datasets. The values of one variable appear on the horizontal axis, and the values of the other variable appear on the vertical axis (Moore et al. 2013). The dots on the scatterplot illustrated above displays the WSE and CT scores of the learners respectively. Figure 2 demonstrates the bivariate distribution and the nature of the correlation between these two variables. The intensity of the correlation is observed through the direction, form, and strength of the relationship between these two variables. The stronger the relationship, the closer the data points fall to the line. It is observed that in Figure 2, the points plotted on the scattered diagram lie on a straight line and have a positive slope; therefore, it is said to have a positive correlation between these two variables. The straight line also resembles a linear relationship between WSE and CT. The coefficient of determination (R^2) mentioned in Figure 2 is considered to be the measure of goodness of fit. The closer the value of R^2 is to

1, it is considered to be the line of best fit. It is regarded as the proportion of variance between two variables. Figure 2 illustrates the value of R^2 as .72, which is closer to 1, the line of best fit. Therefore, from the scatterplot, it is proven that WSE and CT have a positive correlation, and learners who possess high WSE tend to become learners with high critical thinking ability.

5.5 Analysis of Research Question 5

RQ5: What are the perceptions of the learners on developing critical thinking skills and writing self-efficacy?

Qualitative data based on learners' interviews showed that most participants shared a positive perception towards the effectiveness of WSE strategies in enhancing their learning experiences in Writing Self-Efficacy and Critical Thinking. The learners were asked the following questions

1. Do you believe that this study has improved your critical thinking ability?
2. Have you started employing intellectual standards in your academic writing?
3. Did your writing style improve in terms of linguistic self-efficacy, self-regulatory self-efficacy, and performance self-efficacy?

The interviews took place in a supportive classroom atmosphere where the learners felt free to express their thoughts on the interview questions. Based on the significant difference in the scores between their pre-test and post-test, 20 learners from the experimental group were involved in the interview. Later, these interviews were documented and transcribed, and thematic analysis was carried out. The frequency and co-occurrence of particular words or phrases while conducting the interview were identified, and codes were generated based on their answers (Guest et al., 2012). The recurring themes or ideas encompass both the implicit and explicit concepts present in the data. The codes were derived from a total of 20 transcripts, wherein certain repeating themes were identified from the learners' responses, such as 'multiple viewpoints' and 'evaluating strength and weakness'. Other codes generated from the data include topics like 'clear structure,' 'achieve goals,' 'plan before writing,' 'address the needs of the question, ' 'writing-self efficacy strategies,' 'critical thinking ability,' 'understand concepts, ' 'free from errors, ' 'writing as a skill,' 'relevant information, ' 'different ideas, ' 'contradictory, ' 'arguments, ' 'arguments" Confidence,' 'Confidence, ' 'basic concepts, ' 'self-efficacy,' and 'improved my writing.' Some of the responses provided by the learners are given below:

"I usually write answers using basic concepts that I learn during class but after this study, I was able to use the writing self-efficacy strategies and present logical arguments which improved my writing"

- "I have learnt to plan what I am going to write before writing and through writing-self efficacy strategies I was able to write my answers with confidence and produce a clear structure"
- "I was able to write from multiple viewpoints and present my answers with relevant information"
- "I have improved my writing after this study and understood the importance of critical thinking and self-efficacy"
- "While answering questions that required us to think critically, I was able to write with confidence and bring in multiple viewpoints and write answers that are free from errors"

Hence, it is inferred that the learners have cultivated a sense of self-efficacy in writing and developed a positive perception regarding critical thinking. They have recognised the significance of WSE and CT in their academic activities.

6. Discussion

The statistical analysis of writing self-efficacy and critical thinking expounds on the fact that the use of WSE strategies has improved learners' L2 writing self-efficacy and critical thinking. The observed mean values of the pre-test in terms of WSE showed no statistically significant data as the p value ($p = 0.96$, $t(80) = 0.04$) is higher than the $\alpha = 0.05$. As a result, the null hypothesis ($H_0 1$) is accepted. On the other hand, the mean values of the post-test illustrated statistically significant difference in their post-test scores between the control group ($M = 9.85$, $SD = 1.85$) and experimental group ($M = 15.31$, $SD = 2.19$) denoting that the WSE based instruction made a significant impact on the learners' writing self-efficacy. In addition, the p value ($p = 0.00$, $t (80) = 12.17$) is also found to be less than $\alpha = 0.05$, highlighting the improvement in the scores of the learners. Therefore, the null hypothesis is rejected ($H_0 2$) and the alternative hypothesis is accepted and validated.

Similarly, the post-test results regarding CT also revealed a significant difference between the scores of the control group ($M = 9.19$, $SD = 2.05$) and experimental group ($M = 14.73$, $SD = 2.22$), ultimately the p-value ($p = 0.00$, $t (80) = 11.71$) was also less than $\alpha = 0.05$ substantiating the WSE based intervention among the experimental group also enhanced the critical thinking level of the learners. Thus, the null hypothesis is rejected ($H_0 4$) and the alternative hypothesis is accepted. Whereas the pre-test data is found to be ($t(80) = 0.65$, $p = 0.51$), therefore the null hypothesis was accepted ($H_0 3$) ascertaining that there is no significant difference in the pre-test of CT among the learners.

In addition, the current study also found a positive correlation between WSE and CT. The Pearson correlation indicated a very strong relationship ($r = 0.848$) between these two variables, and it was visually depicted through the scatter plot (Fig. 2). The insights derived from the interview provided valuable illumination into the cognitive processes and perspectives of the learners, including their thoughts and reflections. In the initial phase of the study, it was observed that the learners displayed a lack of enthusiasm towards completing the pre-test, for instance, several learners omitted certain essay questions and decided to submit the answer sheet after completing just one

essay question served as evidence that they lacked confidence and self-efficacy when expressing their ideas in writing. In the meantime, through the implementation of the WSE techniques, the learners have developed a sense of self-efficacy in writing. The learners engaged in a self-efficacious writing process, which facilitated the enhancement of their cognitive capacity to analyse, synthesise, and draw inferences which eventually led to the cultivation of critical thinking skills among them. Hence, it can be inferred that the learners who exhibit a greater level of self-efficacy in the domain of writing are more likely to demonstrate an elevated level of critical thinking skills.

7. Conclusion

The primary objective of this research endeavour was to examine the potential relationship between critical thinking (CT) and self-efficacy in the context of writing skills among the learners pursuing higher education. It also sought to investigate the interplay between thinking and writing by examining the influence of writing self-efficacy strategies on learners' critical thinking abilities. The findings obtained from the research illustrate the importance of critical thinking skills in the context of higher education and learners who demonstrated a high level of proficiency in critical thinking (CT) displayed a high level of self-efficacy in writing. The implementation of WSE strategies has been found to facilitate the development of critical thinking skills among learners, which has had a significant impact on their abilities in various domains, including academic contexts, professional settings, and everyday life. Also, the current investigation is not without its inherent constraints and limitations; it focused only on finding the relationship between two variables, namely, WSE and CT. It is suggested that the impact of self-efficacy in writing can also be traced to various variables, such as business writing, technical writing, descriptive writing, persuasive writing, and narrative writing. Moreover, self-efficacy among learners can also be analysed in the context of speaking and reading skills.

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