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Examining Gender and Major Differences in College Students' Metacognitive Awareness of ESP Writing Skills

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Abstract

The aim of this research was to determine the levels of metacognitive awareness among college students in Saudi Arabia, with a focus on both academic majors and gender. There were 113 participants (58 females and 55 males) from the Information Technology (n = 68) and Human Resources (n = 45) majors. Using the Metacognitive Awareness of Writing Questionnaire (MAWQ), the study found moderate levels of metacognition awareness in writing skills, suggesting room to improve. The study found no significant differences between the academic majors, indicating the need for further research on the relationship between cognitive factors and writing skills. Similarly, the study found no significant gender differences in metacognitive awareness among applied college students. Differences in the Regulation of Cognition (RCOG) domain, however, may affect writing. Male students showed lower metacognitive awareness than female students. Instructors and policymakers can use these findings to improve students' metacognitive skills and writing strategies. In the future, researchers should explore other variables and identify effective strategies to improve college students' metacognitive awareness and writing skills.

Keywords: *ESP Writing Skills, Metacognitive Awareness, Gender, Major Differences*

Introduction

Writing effectively in a foreign language is an important skill. It contributes to academic and professional success. However, non-native speakers may experience significant challenges while writing. This is also true for English and its different contexts, such as English for Specific Purposes (ESP). In ESP courses, students are required to write professional emails and reports, which demands specific vocabulary, conventions, and writing styles. Failing to acquire the necessary skills produces ineffective writing. Therefore, students should foster writing skills and strategies.

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Metacognitive strategies such as planning, processing, and evaluating learning enable students to consciously monitor and control their learning (Nasim et al., 2022). Incorporating these strategies into writing lessons can enhance students' writing skills. Using these strategies, students can gain insight into their writing processes and figure out areas for improvement, resulting in more effective writing. Researchers have shown that metacognitive knowledge, which refers to knowledge about oneself, and metacognitive regulation, which refers to monitoring one's understanding, can improve academic performance (Abdelrahman, 2020; Nasim et al., 2022; Liu et al., 2022; Soeharto et al., 2024). However, Basaffar and Bukhari (2023) observed that Saudi Arabia has not extensively studied metacognitive strategies in relation to EFL writing. Further, Wu (2022) asserts that metacognitive techniques and their efficacy for improving writing skills among Saudi Arabian applied college students remain unexplored. Further research is required to help students develop more effective composition skills and understand the integration of metacognitive strategies into ESP writing instruction.

This study examines the effectiveness of integrating metacognitive strategies in writing instruction to enhance the writing skills of Saudi Arabian college students in ESP courses. The study addresses a gap in the literature by focusing on the practical skills of email communication, which improve students' writing skills and contribute to metacognitive awareness. In addition to providing insight into effective teaching methods for ESP students, the findings can have practical implications for instructors, researchers, and curriculum developers. Further, the study's relevance to Saudi Arabian students allows tailored instruction to meet their linguistic and cultural needs.

Literature Review

The Relationship between Metacognitive Awareness and ESP Writing Skills

The goal of teaching ESP is to equip students with the language abilities necessary for certain professional contexts. In other words, ESP emphasizes technical English (Nasim & Mujeeba, 2021). It prioritizes how language is learned rather than how information is presented, with a stronger psychological influence than a linguistic one. To assist students in recognizing subjects, identifying keywords, comprehending vocabulary and grammar rules, and responding to comprehension-based questions, ESP teachers frequently use top-down exercises. ESP includes guessing, predicting, listing, and ordering information, among other activities. Because this method requires background information on the topic, speakers, and context, metacognition is extremely important in the context of ESP (Mohd Nasim, 2022; Nasim et al., 2022).

Metacognition is similar to having the ability to steer and control one's cognitive processes, much like a captain of a ship. Planning, observing, and assessing are some of the tasks involved in the intentional management of learning. It involves critical thinking, evaluating acquired knowledge, and recognizing the methods and strategies used in problem-solving. Furthermore, the concept of metacognition includes understanding how and when to apply particular strategies, understanding how cognitive processes function, and awareness of comprehension (Bezanilla et al., 2019; Jones et al., 2020; Soto et al., 2022).

Writing and metacognition are related because writing requires mental regulation in order to employ the right tactics. The writing process consists of three distinct phases: prewriting, while-writing, and post-writing. These stages may also be referred to as planning, translating,

and reviewing (Villaruz & Palma, 2024). In all of these stages, learners' use of writing strategies has a significant impact on their effective writing performance. However, there has been limited discussion on metacognition-based writing strategies in context of EFL. Recently, there has been a surge of interest in teaching metacognitive thinking to novice writers to enhance their writing skills. Previous studies have also shown that metacognitive support in groups can benefit writing outcomes (Gay, 2022; Koka et al., 2024; Teng & Yue, 2023; Razzaq & Hamzah, 2024).

Gender Differences in the Levels of Metacognitive Awareness and Writing Performance

Gender differences have been a topic of interest in various fields, including education. In the context of metacognitive awareness and writing performance, some researchers have explored the potential differences between female and male students. Metacognitive awareness differs between women and men, according to some studies. Female students showed higher levels of metacognitive awareness than male students in a study by Aydin and Ayranci (2018). In the metacognitive awareness assessments by Graham and Harris (2003), female students performed better than male students. Studies on gender variations in writing performance, however, have produced conflicting findings. Some research findings show no discernible gender differences, whereas other studies' results suggest the contrary (Trapman et al., 2018). Furthermore, research indicates that female students outperform their male counterparts when it comes to writing assignments. (Abdelrahman, 2020; Aydin & Ayranci, 2018).

In previous studies investigating gender disparities in writing performance, researchers have found conflicting results, despite changing the precise writing tasks under test. Using an independent-sample t-test, Ozfidan and Mitchell (2020) examined if there was any difference in the argumentative essay writing performance of females and males. The results revealed significant gender differences in argumentative writing. Male students had trouble structuring and arranging their essays, using academic references, coming up with rebuttals and counterarguments, and adopting a proper academic tone. On the other hand, female students found it challenging to come up with a compelling thesis statement, gather sufficient supporting data, and ensure the essay's organization and content. These research findings imply that, depending on the kind of writing activity, gender variations in writing performance may occur.

Teaching Metacognitive Strategies for Writing Improvement

Developing metacognitive techniques is necessary to improve writing skills. The capacity to deliberately consider and choose how to approach a problem based on one's own thinking and learning processes is referred to as metacognitive talent. Metacognition can enhance various writing processes such as planning, organizing, and revising. Much research has looked into how training metacognitive techniques might improve writing skills. Teng et al. (2022) examined how metacognitive strategy training affected students' writing skills. The experimental group's writing skills were noticeably better than those of the control group, which got conventional writing instruction.

The process method is a well-liked metacognitive technique for improving writing that divides the writing process into manageable parts and invites students to evaluate their development. Much research has demonstrated how well the process approach works to help students become better writers (Alodwan & Ibnian, 2014; Sun & Zhang, 2022).

Self-regulated strategy development (SRSD) is another metacognitive technique to improve learners' writing skills. Students in the SRSD receive instruction on how to plan, monitor, and assess their writing process, along with strategies for resolving obstacles. The main goal of SRSD is to give students precise instructions on how to employ specific writing techniques, like outlining, brainstorming, and revising. This method not only makes students more conscious of their writing skills but also helps them control their thoughts and behaviors when writing, making them more competent and self-assured writers (Collins et al., 2021; Sun et al., 2022; Teng, 2022).

In addition to these strategies, several best practices for teaching metacognitive strategies for writing improvement have been found. These include feedback, scaffolding, modeling, and explicit instruction. Another way to promote metacognitive thinking in learners is to have them evaluate how they write, make objectives, and track their development (Al-khresheh et al., 2022; Zohar & Ben-Ari, 2022). Teng and Yue (2023) used structural equation modeling (SEM) to investigate university students' academic writing, critical thinking, and metacognition skills. The study examined whether awareness of metacognition fosters critical thinking and, thus, enhances academic writing. The study employed a metacognitive knowledge and regulation measure to investigate metacognitive writing strategies. Learners were assessed on five skills: recognizing assumptions, inference, deduction, interpretation, and evaluating arguments. Using an internal test, academic writing was assessed. Three models are examined: (1) metacognition's role in critical thinking, (2) metacognition's role in academic writing, and (3) correlations between critical thinking and metacognition. The study also found a significant relationship between the three variables. Villaruz and Palma (2024) observed in their study that students consistently used writing methods influenced by their metacognitive awareness. Students specifically used these strategies for preparing, monitoring, and assessing their academic compositions. Furthermore, instructors play a critical role in fostering learning by providing explicit guidance on writing standards and methodologies. In addition, getting feedback from both educators and classmates is essential in enhancing students' competence in academic writing, particularly in domains such as grammar, spelling, linguistic organization, and technical elements.

Integrating Metacognitive Strategy Instruction in ESP Writing Courses

Metacognitive strategy instruction can be helpful when teaching ESP courses. By employing metacognitive methods, students can acquire a set of cognitive abilities that improve their writing performance. Writing technical or academic papers in ESP classes frequently calls for a high degree of topic knowledge and writing proficiency. Thus, teaching metacognitive techniques might help students create techniques for organizing, tracking, and assessing their writing output. With this method, students may pinpoint their advantages and disadvantages and create winning plans of action to overcome them. Furthermore, metacognitive techniques support autonomous learning and give students more control over their education. Incorporating metacognitive strategy training into writing assignments can enhance students' writing skills in ESP classes (Al-khresheh et al., 2023; Chen, 2022; Cheng, 2021; Zohar & Ben-Ari, 2022).

Seventeen graduate students at a US university participated in classroom instruction, according to a study by Santelmann et al. (2018). During the class, the main topics covered

were text strategies, metacognitive writing techniques, and self-monitoring writing activities. Through planning and surveying, researchers gathered data. The study's five primary themes emerged: a stronger grasp of the structure of academic writing, peer paper evaluation, stressor identification, students' increased awareness of their writing practices, and the use of social support during the writing process were the five primary themes that emerged from the study. Students met their writing goals and experienced less writing-related stress by using social support strategies and cooperative peer review, guided by their professors.

Al-Jarrah et al. (2018) implemented a teaching program based on the CALLA model with Jordanian secondary school students. The experimental group received writing instruction based on metacognitive strategies; on the other hand, the control group followed routine writing training. After twelve weeks, post-tests revealed a positive result on the experimental group's writing performance. The results indicated that teaching metacognitive strategies improved writing skills significantly, surpassing the control group's proficiency. The study highlights the importance of metacognition in enhancing English writing proficiency and suggests the need for clear instructions, modeling, and individualized practice in language instruction. The study also notes that cultural factors influence the employment of metacognitive strategies in writing instruction, highlighting the need for further investigation in this area.

Al Moqballi et al. (2020) conducted a study on Omani EFL grade twelve students to evaluate their use of metacognitive writing strategies and their influence on language performance. A sample of 263 students participated, with findings showing high use of planning, monitoring, and evaluation strategies. Despite no significant link between language performance and strategy use, gender differences emerged, with females employing these strategies more than males. Students most commonly used planning strategies, while they used evaluation strategies the least. Semi-structured interviews confirmed that students initiate writing tasks with a plan. This emphasizes the importance of metacognitive strategies in enhancing writing proficiency and organizational skills among students. Özçakmak et al. (2021) also investigated the relationship between teacher applicants' degrees of cognitive and metacognitive awareness and their gender, department of study, and academic achievement. Gender or academic standing did not significantly impact the teacher applicants' levels of cognitive awareness. However, metacognitive awareness levels varied based on the department of study, with numerically weighted departments exhibiting higher levels. Academic achievement positively influenced metacognitive awareness levels, and gender differences in metacognition were not noticeable. Moreover, there was a difference in metacognitive awareness levels based on age. Therefore, providing academic guidance to secondary school students is crucial for improving their metacognition.

Research Questions

The purpose of this research is to study how integrating metacognitive strategies into writing instruction can enhance Saudi Arabian applied college students' writing proficiency when it comes to composing professional emails. This study aims to bridge the gap between how metacognitive awareness affects the ability of Saudi ESP-applied college students to compose professional emails by conducting a thorough literature review, describing the research methodology, and discussing the study's implications. The study will be guided by the following research questions:

RQ1: How does knowledge of cognition (KCOG) affect the writing skills of applied college students in Saudi Arabia?

RQ2: How does the regulation of cognition (RCOG) affect the writing skills among applied college students in Saudi Arabia?

RQ3: Are there any statistically significant differences among students based on their academic majors in levels of metacognitive awareness and its relation to writing skills?

RQ4: Are there any gender differences in the levels of metacognitive awareness and writing performance among applied college students in Saudi Arabia?

Methodology

Sample

The study included 113 students at the Applied College, of whom 58 were female and 55 were males. There were 68 IT participants and 45 Human Resources participants. The sample's age range was limited to individuals between 19 and 20 years old, with a mean age of 19.5. The study recruited both IT and Supply students for a primary reason. The researchers chose IT as a representative of a scientific major and Human Resources as a representative of an art major. The study acknowledges and discusses this information as a limitation. The specific focus on IT and Human Resources students, selected based on available options at the participating universities, may limit the study's generalizability. The standard deviation can vary, but a typical age distribution within this range might be around 0.5 to 1 year. Participants were in their third semester of an ESP course focused on professional email writing. Convenience sampling was used to select the participants. Convenience sampling is a technique that substitutes randomly selecting participants for those who are conveniently reachable and readily available (Sarker & Al-Muaalemi, 2022). For this reason, researchers often use this sampling technique when they have limited time and resources or when reaching the target population is challenging. Convenience sampling entails numerous restrictions and carries the potential for bias. The results may not generalize to other cohorts or situations because the sample does not represent the entire population.

Instrument

This study used the MAWQ, which was created via a thorough literature analysis and other research projects (Farahian, 2017; Ramadhanti & Yanda, 2021; Mohamed & Shaaban, 2023). This self-report tool included two portions with forty statements each: knowledge of cognition (KCOG) and regulation of cognition (RCOG). Measuring the participants' metacognitive awareness in relation to their writing skills was the questionnaire's main goal. The KCOG portion evaluated the respondents' comprehension of writing processes and techniques, while the RCOG section tested their capacity to regulate writing processes and tactics. The participants filled out a questionnaire at the end of the trial to assess their metacognitive awareness and note any changes that might have happened. In this study, the questionnaires were distributed in both Arabic and English. It was necessary to follow a rigorous translation process to ensure the translated version's accuracy and validity. A professional translator who is fluent in both languages first translated the questionnaire from English to Arabic. After the translation, three experts in the field of study reviewed the Arabic version of the questionnaire. Their primary duty was to ensure that the translation was accurate, preserving the meaning and

intent of the original English version. Experts also evaluated whether the translated items were linguistically and culturally appropriate. The data was checked for normal distribution. Table 1 presents the results.

Table 1
Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk			Skewness	Kurtosis
	Statistic	df	Sig.	Statistic	df	Sig.		
KCOG Composite Score	.109	113	.002	.961	113	.002	0.059	-0.965
RCOG Composite Score	.112	113	.001	.967	113	.007	0.009	-0.815

The Shapiro-Wilk values of both constructs, KCOG and RCOG, were not significant, i.e., (0.002 and 0.001). This means that the data did not meet the normality criteria. Furthermore, for both the KCOG and RCOG variables, the skewness value was 0.059, indicating a slight positive skewness. This implies a slight rightward skewness in the distribution. Additionally, the KCOG kurtosis value was -0.965, and the RCOG variable was -0.815. These values indicated that the distribution was slightly flatter (less peaked) than the normal distribution. The Mann-Whitney U test can be considered the nonparametric equivalent of the independent t-test, as suggested by McKnight and Najab (2010). The Mann-Whitney U test does not make any assumptions about the data's distribution, in contrast to the t-test. Because of this, the Mann-Whitney U test is a better option when the data do not fulfill the t-test's parametric assumptions. A better statistical test to compare two independent variables or groups is the Mann-Whitney U test.

Cronbach's alpha coefficients, which were 0.873 for the first dimension and 0.867 for the second dimension, indicated a high level of scale reliability. The scale's total reliability was 0.927, with all 40 items demonstrating high reliability. Table 2 summarizes the MAWQ's reliability in two dimensions.

Table 2
The Values of the Reliability Coefficient for each Dimension of the Scale

Dimensions	Number of Items	Cronbach's alpha
Knowledge of Cognition (KCOG)	21	0.873
Regulation of Cognition (RCOG)	19	0.867
Total Reliability	40	0.927

Procedure

This study used a correlational research design to examine the effects of metacognitive awareness on Saudi Arabian students' writing proficiency. Using convenience sampling techniques, the researchers recruited participants in an ESP writing course who focused on professional email writing. Throughout the course, students learned metacognitive strategies for improving their writing skills. Participants completed a modified version of the Metacognitive Awareness Writing Questionnaire (MAWQ) after completing the course. The MAWQ included a total of 40 statements (KOG = 21 and RCOG = 19).

Both descriptive and inferential statistics were used to analyze the MAWQ data. This study looked at the connection between writing skills and metacognitive awareness. The study also looked at how gender affects the connection between writing proficiency and metacognitive

awareness. Each procedure was carried out following ethical guidelines. All participants were required to provide informed consent prior to participation. All data collected was kept confidential and anonymous to protect participants' privacy.

Data Analysis

The researchers used descriptive and inferential statistical techniques to analyze the data collected through the MAWQ. Internal consistency was measured using Cronbach's alpha coefficient. Associations between metacognitive awareness, writing skills, academic major, and gender were investigated using inferential statistical methods such as an independent sample Mann-Whitney U test. The data was analyzed using SPSS Version 27, with a significance level of $p < .05$. The results were displayed in narrative form, tables, and graphs. A mean score between 3.67 and 5.00 showed high use, a mean score between 2.33 and 3.66 suggested moderate use, and a mean score between 1.00 and 2.32 indicated low use were the criteria used to interpret means and standard deviations. Academic main differences in these measures, as well as gender-based variations in writing performance and metacognitive awareness, were examined using Mann-Whitney U tests.

Results

To answer the first research question, rank of each item, means, and standard deviations were calculated as follows:

Table 3

Means and Standard Deviations for the KCOG Domain (N=113)

Order	Rank	Mean	SD	Level
1	15	3.88	1.33	High
2	18	3.81	1.35	High
3	9	3.79	1.41	High
4	8	3.78	1.37	High
5	7	3.75	1.36	High
6	1	3.75	1.31	High
7	17	3.73	1.40	High
8	3	3.72	1.42	High
9	16	3.67	1.39	High
10	19	3.65	1.39	Moderate
11	10	3.65	1.48	Moderate
12	14	3.62	1.41	Moderate
13	12	3.61	1.43	Moderate
14	5	3.58	1.45	Moderate
15	20	3.57	1.43	Moderate
16	13	3.57	1.40	Moderate
17	21	3.55	1.41	Moderate
18	11	3.52	1.47	Moderate
19	4	3.52	1.44	Moderate
20	6	3.51	1.51	Moderate
21	2	3.42	1.46	Moderate
		3.65	1.41	Moderate

The impact of cognition knowledge on the writing skills of applied college students in Saudi Arabia was studied, and the results are presented in Table 3. The 21 writing skill items are classified into high, moderate, and total degrees based on their mean scores and standard

deviations. The high-level items indicate a thorough understanding of the writing process, while the moderate-level items suggest a moderate understanding of writing strategies. The participants showed moderate metacognitive awareness, scoring a mean of 3.65 and a standard deviation of 1.41. Item 15 had the highest agreement, with a mean score of 3.88 and a standard deviation of 1.33, whereas Item 2 had the least agreement, with a mean score of 3.42 and a standard deviation of 1.46.

To answer the second question, ranks, means, and standard deviations of all items were calculated.

Table 4

Means and Standard Deviations for RCOG Domain (N=113)

Order	Rank	Mean	SD	Level
1	8	3.88	1.39	High
2	13	3.84	1.41	High
3	2	3.83	1.30	High
4	6	3.80	1.43	High
5	10	3.74	1.37	High
6	17	3.73	1.43	High
7	4	3.72	1.42	High
8	18	3.72	1.45	High
9	15	3.65	1.44	Moderate
10	9	3.64	1.45	Moderate
11	19	3.62	1.55	Moderate
12	1	3.61	1.49	Moderate
13	7	3.59	1.42	Moderate
14	3	3.54	1.48	Moderate
15	11	3.53	1.41	Moderate
16	14	3.53	1.50	Moderate
17	5	3.50	1.46	Moderate
18	12	3.47	1.49	Moderate
19	16	3.47	1.45	Moderate
		3.65	1.44	Moderate

Table 4 presents data on the writing skills of applied college students in Saudi Arabia, particularly in relation to cognition regulation. The items are numbered from 1 to 19 and are arranged in order from highest to lowest mean score. Each item provides its mean and standard deviation, along with its order and level (high or moderate). The highest-level statements (items with a high level) are listed first, starting with item 8, which has the highest mean score of 3.88, indicating that the students use their existing knowledge to develop their ideas. Effective writing practices, like avoiding unfamiliar vocabulary and grammar, reading before writing, and focusing on the text's structure and rules, also inform the next four highest items. However, they also had difficulty writing when they started. The lowest level statements (items with a moderate level) are listed last, starting with item 9, which indicates that the students generally focus more on delivering messages than providing detailed explanations. Other moderate-level statements include reviewing the text structure for ideological integration, writing while thinking, and visualizing writing in different ways before starting. The data show that the students have a moderate level of cognitive regulation when it comes to writing, with a mean score of 3.65. However, this degree also demonstrates that they are close to achieving a high level of metacognitive knowledge regulation.

To investigate the association between writing performance and the levels of metacognitive awareness according to gender, the researchers applied an independent sample Mann-Whitney U test.

Table 5

Mann-Whitney U Test Results for Gender-based Differences in Metacognitive Awareness and Writing Performance

	N	Mann-Whitney U test	Wilcoxon W	Z	Asym Sig. (2-sided)	Effect Size = z / sqrt(N)
KCOG	113	1863	3574	1.54	0.124	0.144
RCOG	113	2027	3738	2.483	0.013	0.233

**The difference is significant at the 0.05 level.*

Figure 1

Mann-Whitney U Test Results for Gender Differences

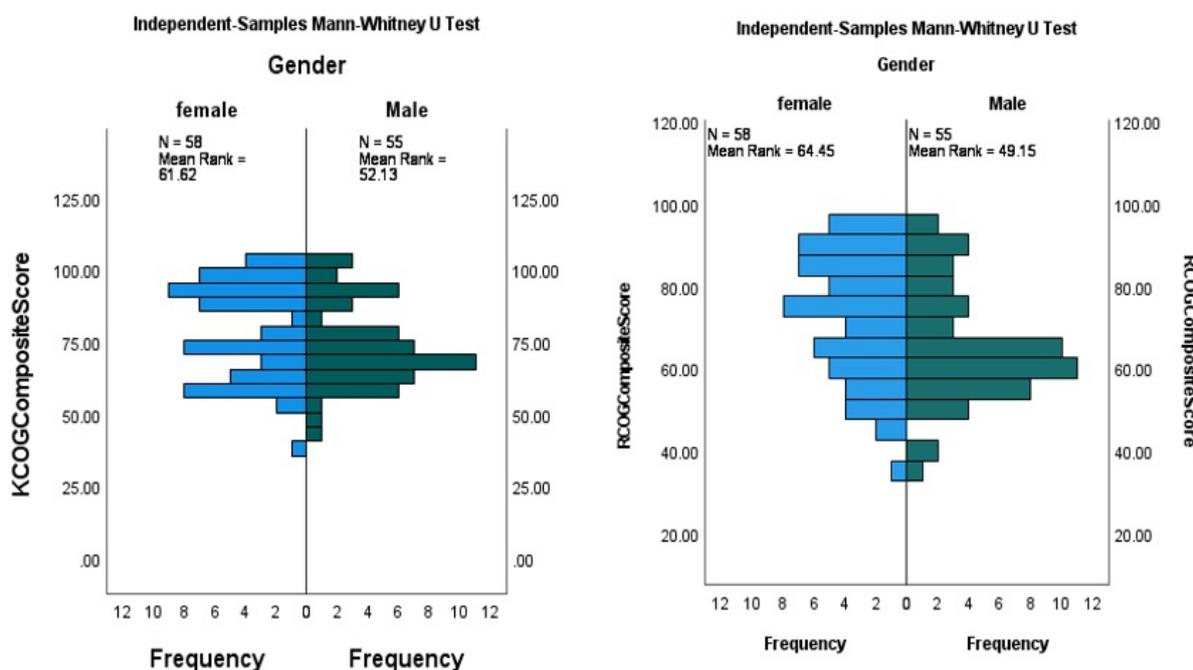


Table 5 displays the outcomes of an independent Mann-Whitney U test that assessed gender disparities in metacognitive awareness levels among applied college students in Saudi Arabia. The table enumerates the variables under measurement (KCOG or RCOG), along with their z-values, significance (Sig.*) values, and effect sizes. Figure 1 displays both types of RCOG and KCOG, based on gender (male and female). Each group's mean ranks and standard deviations are counted in. For the KCOG, there is no statistically significant difference in metacognitive awareness across genders. The p-value of 0.124 does not meet the standard significance level of 0.05. Therefore, there is insufficient data to rule out the null hypothesis. Any discrepancies in male and female students' KCOG could be due to sample variability or random chance. The observed differences may nevertheless have some practical value even if they are not statistically significant, as indicated by the effect size of 0.144, which suggests a small influence. However, there is a statistically significant difference in the RCOG between genders. The p-value of 0.013 is less than the conventional significance level of 0.05. Therefore, the null

hypothesis is rejected. It indicates that the observed differences in cognitive regulation between male and female students are unlikely to have occurred by chance alone. The effect size of 0.233 suggests a moderate effect, indicating that the observed differences in the RCOG between female and male students may have practical significance and have a positive influence on writing performance. These findings suggest that among applied college students in Saudi Arabia, there may not be significant gender differences in KCOG. However, there are significant gender differences in the RCOG. While the KCOG may not significantly differ between genders, the differences in the RCOG may have implications for writing performance.

To investigate the potential differences between the levels of metacognitive awareness and writing performance based on academic major, an independent sample Mann-Whitney U test was applied to determine the mean differences.

Table 6
Mann-Whitney U Test Results for Academic Major Differences in Metacognitive Awareness and Writing Performance

	N	Mann-Whitney U test	Wilcoxon W	Z	Asym Sig. (2-sided)	Effect Size = z / sqrt(N)
KCOG	113	1398.500	2433.500	-.772	0.440	-0.072
RCOG	113	1635.500	2670.500	.619	0.536	0.058

*The difference is significant at the 0.05 level.

Figure 2
Mann-Whitney U Test Results for Academic Major Differences

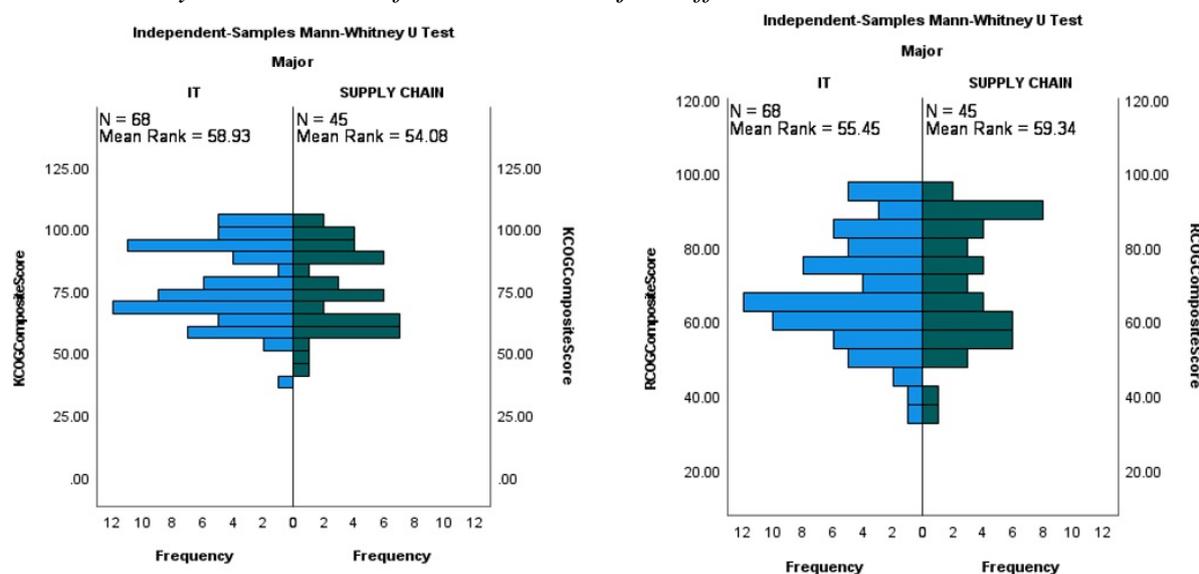


Table 6 displays the results of an independent Mann-Whitney U test that assessed differences in academic majors for metacognitive awareness levels (KCOG and RCOG) among applied college students in Saudi Arabia. The table lists the measured variables KCOG or RCOG, z-values, significance (Sig.*) values, and effect sizes. Figure 2 shows both KCOG and RCOG based on academic majors (IT and Human Resources). Each group's mean ranks and standard deviations are included. The data reveals differences between IT and Human Resources students' mean ranks. Human Resources students got higher mean ranks in RCOG, while IT students obtained higher mean ranks in KCOG.

The Mann-Whitney Wilcoxon test did not find a statistically significant difference in KCOG levels between IT and Human Resources students ($p > 0.05$). There isn't enough evidence to reject the null hypothesis. Therefore, there is no statistically significant difference in KCOG levels between IT and Human Resources students. The effect size for this comparison is also tiny ($r = -0.072$), suggesting a slight difference in KCOG levels between the two academic majors, but it is not statistically significant. Furthermore, the Mann-Whitney Wilcoxon test did not find a statistically significant difference in RCOG levels between IT and Human Resources students ($p > 0.05$). There isn't enough evidence to reject the null hypothesis. As a result, there is no statistically significant difference between IT and HR students' RCOG levels. The comparison's impact size ($r = 0.058$) is tiny, suggesting that there is only a slight variation in RCOG levels between the two academic majors that is not statistically significant.

The results address the research questions and disprove the study's hypotheses. The study's conclusions shed important light on Saudi Arabian applied college students' writing skills and metacognitive awareness. The findings suggest that although students have a reasonable understanding of how cognition relates to writing skills, they could need more direction and training to improve their writing techniques. Moreover, there are no statistically significant variations in the levels of metacognitive awareness among academic disciplines; in terms of KCOG and RCOG, IT students outperform Human Resources students, and there are no gender disparities in this regard. To learn more about the connection between these cognitive elements and learners' writing skills, more research is required. The aforementioned findings have significant implications for instructors, researchers, and policymakers, emphasizing the need for focused interventions and assistance in order to improve students' metacognitive abilities and writing proficiency. Future studies should look into the causes of these variations and create efficient interventions to help students improve their writing and metacognitive awareness.

Discussion

The study explores the awareness of metacognition among applied college students studying ESP writing, with a focus on gender and academic majors. The goal of this research was to provide educators with recommendations on how to enhance instruction in higher education by promoting the acquisition of these competencies. In response to the first research question, the study found that applied college students had a modest level of metacognition awareness regarding their writing skills. These findings are in line with those of Alodwan and Ibnian (2014), Mohamed & Shaaban (2023), and Al-Zubeiry (2019). There were also comparable levels of metacognition awareness. A high level of MAWQ questions indicated that students understood the writing process. However, they still needed to improve their writing technique at the intermediate level. This study confirms Villaruz and Palma's (2024) findings, which found that students need specialized writing instruction and practice to improve their writing. As the current results demonstrate, even with no significant differences in metacognitive awareness between academic majors, there remains a concerning performance gap between IT and HR students in core cognitive factors, such as KCOG and RCOG. This suggests that merely possessing metacognitive abilities may not be sufficient to translate into effective written communication.

As for the second question, this study presents a mixed picture regarding Saudi Arabian college students' writing skills. On the one hand, these results match with previous research suggesting that students are moderately aware of and competent in their writing skills. For instance, studies by Al-Zubeiry (2019) and Alodwan & Ibnian (2014) have reported similar findings, suggesting that Saudi students possess fundamental writing skills. Other researchers, on the other hand, have found contrasting results, which raises some questions. As demonstrated by Collins et al. (2001), Aydin & Ayranci (2018), and Abdelrahman (2000), students demonstrate greater control over the writing process. They demonstrate strong writing skills by generating ideas, adhering to conventions, and collaborating effectively.

One potential explanation for these divergent findings could be differences in assessment methods and criteria used across the various studies. The evaluation and measurement of writing skills may have varied, resulting in slightly different conclusions about the students' capabilities. Additionally, the specific writing tasks, classroom contexts, and student populations examined may have influenced the results. In addition, specialized writing instruction and practice can have a significant impact. Even though some studies found students to be reasonably adept at writing, the findings of this study align with other studies, suggesting that students' writing skills could improve with more focused instruction and practice. Hence, focused educational interventions might be able to benefit students (Aydin & Ayranci, 2018; Collins et al., 2021; Mohamed & Shaaban, 2023). It is challenging to evaluate and enhance writing skills across educational systems and cultures, as shown by the inconclusive results. If we want to know how well Saudi Arabian college students write and how to help them improve in this crucial area of study and work, we may need to conduct more standardized studies and put more emphasis on writing classes and workshops.

Regarding the third research question, the results indicate that there was no significant gender differences in KCOG among Saudi Arabian applied college students. However, the RCOG showed notable variations between genders. Even though there are no appreciable variations in KCOG between genders, RCOG discrepancies can be detrimental to writing performance. In addition, compared to their male peers, female students showed greater levels of metacognitive awareness. This study discovered that women employed metacognition more frequently, which is consistent with other studies. To ascertain the reasons behind these gender disparities, it is imperative to look at the underlying issues. Studies have indicated that women tend to be more cognizant of metacognition than men (Basaffar & Bukhari, 2023; Collins et al., 2021; Farahian, 2017; Sun et al., 2022). Nevertheless, the reasons behind these gender disparities are still unknown and need more research.

The answer to the fourth study question revealed that IT students had higher average scores in KCOG and RCOG compared to Human Resources students. There are numerous explanations for this result. First of all, the increased emphasis on critical thinking techniques and self-regulated learning activities in IT programs may have enhanced students' cognitive capacities. Students in these programs frequently work on challenging assignments that call for higher levels of cognitive processing and self-control. Second, a lot of IT programs include writing-intensive courses, which can help students improve their writing skills and deepen their grasp of the writing process. Furthermore, IT students often have to produce technical reports and documentation as part of their coursework and professional obligations. This necessitates a deeper understanding of the writing process, as well as an advanced level of cognitive

regulation, in order to produce technical writing that is both clear and concise. When compared to Human Resources students, IT students may score higher on KCOG and RCOG due to their overall tendency to have a better understanding of the writing process and better cognitive regulation.

The findings, however, suggest that more guidance and instruction may be necessary for students to advance their writing skills, even if they demonstrate a modest level of cognition connected to writing ability. Additionally, there were no significant differences in the levels of metacognitive awareness between academic majors, and IT students outperformed HR students in both KCOG and RCOG. More research is needed to ascertain whether these cognitive factors are related to writing skills. Ultimately, the demographic and academic backgrounds of the students in each program should be closely examined to identify any preexisting differences that could have influenced the development of metacognitive skills. The study provides important insights into the factors that influence college students' metacognitive awareness. The results can be used to develop focused interventions and strategies that will support the development of these essential skills and improve the caliber of teaching and learning. The study's conclusions hold significant implications for educators and legislators who aim to enhance college students' academic performance and metacognition, despite its limited generalizability to other populations.

Conclusion

This study examined metacognitive awareness and its influence of gender and academic majors on writing skills among Saudi applied college students. Students demonstrated moderate metacognition in relation to their writing skills, indicating opportunities for enhancement and further guidance. Furthermore, there was no significant difference in metacognitive awareness levels between academic majors, indicating that cognitive factors influence writing skills. In terms of gender disparities, the study found that while KCOG may not differ substantially between genders, RCOG differs considerably. Compared to their male counterparts, female students showed higher metacognitive awareness. A critical need for further research is to understand the underlying causes and develop effective strategies for promoting metacognitive processes among Saudi male students. Additionally, the study identified differences in metacognitive awareness between IT and Human Resources students. The Human Resources students ranked higher for RCOG, while IT students ranked higher for KCOG. However, metacognitive awareness levels did not differ significantly between the two academic majors. Furthermore, educators and policymakers could use this information to enhance students' metacognition and academic achievement. This study's findings have practical implications for improving writing instruction and student performance in Saudi Arabian applied colleges. They contribute to the existing literature on metacognitive awareness in academic writing.

The findings of this study can be used to improve the pedagogy of English instructors teaching writing to Saudi Arabian applied college students. The writing process can be integrated with strategies such as self-reflection, planning, and self-evaluation to promote metacognition. In addition to providing feedback to help students improve their writing skills, instructors can use the Metacognitive Awareness Writing Questionnaire (MAWQ) to assess students' metacognitive awareness. Moreover, instructors can incorporate metacognitive strategies into writing tasks and provide opportunities for students to receive peer and instructor

feedback on their writing, focusing on both the writing process and the final product. As a result, students will be able to develop their metacognitive awareness and improve their writing skills.

There are several limitations to the study, including self-reported data, a small sample size, and failure to consider other factors that could affect metacognitive awareness and writing performance. Researchers should conduct a replication of the current study with larger and more diverse samples, utilizing multiple data sources to assess participants' skills. The specific focus on IT and Human Resources students, selected based on available options at the participating universities, may limit the study's generalizability. Future studies should also examine metacognitive awareness and writing performance, as well as motivation and learning styles. Practical implications include identifying areas where students may need additional support and instruction, tailoring feedback and instruction to meet the unique needs of students in various academic majors, and promoting metacognitive awareness as part of the curriculum in Saudi Arabian applied colleges.

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Ethics Declarations

Competing Interests

No, there are no conflicting interests.

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References

- Abdelrahman, R. M. (2020). Metacognitive awareness and academic motivation and their impact on academic achievement of Ajman University students. *Heliyon*, 6(9), e04192. <https://doi.org/10.1016/j.heliyon.2020.e04192>
- Al Moqbali, I. S., Al Humaidi, S., Al Mekhlafi, A., & Hilal, M. A. (2020). Metacognitive writing strategies used by Omani grade twelve students. *International Journal of Learning, Teaching and Educational Research*, 19(8), 214-232. <https://doi.org/10.26803/ijlter.19.8.12>

- Al-Jarrah, T. M., Mansor, N., & Ab Rashid, R. (2018). The impact of metacognitive strategies on Jordanian EFL learners' writing performance. *International Journal of English Linguistics*, 8(6), 328-339. <https://doi.org/10.5539/ijel.v8n6p328>
- Al-khresheh, M., Mohamed, A. M., & Asif, M. (2022). Teachers' perspectives towards online professional development programs during the period of COVID-19 pandemic in the Saudi EFL context. *FWU Journal of Social Sciences*, 16(2). <http://doi.org/10.51709/19951272/Summer2022/1>
- Al-khresheh, M., Mohamed, A., & Bin Ali, R. (2023). A study on writing apprehension among Saudi undergraduate EFL students. *Language Teaching Research Quarterly*, 34, 1-18. <https://doi.org/10.32038/ltrq.2023.34.01>
- Alodwan, T. A. A., & Ibnian, S. S. K. (2014). The effect of using the process approach to writing on developing university students' essay writing skills in EFL. *Review of Arts and Humanities*, 3(2), 139-155.
- Al-Zubeiry, H. Y. A. (2019). The efficacy of meta-cognitive strategies instruction in enhancing Saudi EFL students' academic writing. *International Journal of Social Sciences & Educational Studies*, 5(4), 71. <https://doi.org/10.23918/ijsses.v5i4p71>
- Aydin, G., & Ayranci, B. B. (2018). Metacognitive writing skills strategy awareness of secondary school students. *Modern Journal of Language Teaching Methods*, 8(5), 369-378.
- Basaffar, F. & Bukhari, S (2023). Saudi university learners' metacognitive abilities and writing performance. *Sch Int J Linguist Lit*, 6(2): 120-129. <https://doi.org/10.36348/sijll.2023.v06i02.004>
- Bezanilla, M. J., Fernández-Nogueira, D., Poblete, M., & Galindo-Domínguez, H. (2019). Methodologies for teaching-learning critical thinking in higher education: The teacher's view. *Thinking Skills and Creativity*, 33, 100584. <https://doi.org/10.1016/j.tsc.2019.100584>
- Chen, A. H. (2022). The effects of writing strategy instruction on EFL learners' writing development. *English Language Teaching*, 15(3), 29-37. <https://eric.ed.gov/?id=EJ1334542>
- Cheng, A. (2021). The place of language in the theoretical tenets, textbooks, and classroom practices in the ESP genre-based approach to teaching writing. *English for Specific Purposes*, 64, 26-36. <https://doi.org/10.1016/j.esp.2021.07.001>
- Collins, A. A., Ciullo, S., Graham, S., Sigafos, L. L., Guerra, S., David, M., & Judd, L. (2021). Writing expository essays from social studies texts: A self-regulated strategy development study. *Reading and Writing*, 34, 1623-1651. <https://doi.org/10.1007/s11145-021-10157-2>
- Farahian, M. (2017). Developing and validating a metacognitive writing questionnaire for EFL learners. *Issues in Educational Research*, 27(4), 736-750. <https://search.informit.org/doi/10.3316/ielapa.218613409807923>
- Gay, F. (2022). Investigating the effects of technology-enhanced vocabulary learning strategy instruction on supporting mixed-ability EMI learners studying a journalism and communication major: An action research project at a university in China. *Journal of English for Academic Purposes*, 55, 101068. <https://doi.org/10.1016/j.jeap.2021.101068>
- Graham, S., & Harris, K. R. (2003). Students with learning disabilities and the process of writing: A meta-analysis of SRSD studies. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 323-344). The Guilford Press.
- Jones, J. S., Milton, F., Mostazir, M., & Adlam, A. R. (2020). The academic outcomes of working memory and metacognitive strategy training in children: A double-blind randomized controlled trial. *Developmental Science*, 23(4), e12870. <https://doi.org/10.1111/desc.12870>
- Koka, N. A., Khan, M. H., Ahmad, J., Wahab, M. O. A., & Khasawneh, M. A. S. (2024). Essence of metacognitive awareness strategies in acquiring/developing proficiency in different foreign language skills: An effective language learning experience. *Migration Letters*, 21(1), 583-594. <https://doi.org/10.59670/ml.v21i1.5359>
- Liu, G. Z., Rahimi, M., & Fathi, J. (2022). Flipping writing metacognitive strategies and writing skills in an English as a foreign language collaborative writing context: a mixed-methods study. *Journal of Computer Assisted Learning*, 38(6), 1730-1751. <https://doi.org/10.1111/jcal.12707>
- McKnight, P. E., & Najab, J. (2010). Mann-Whitney U test. In I. B. Weiner & W. E. Craighead (Eds.), *The Corsini encyclopedia of psychology* (pp. 1-1). John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470479216.corpsy0524>
- Mohamed, A. & Shaaban, T. (2023). Investigating college students' metacognitive awareness in enhancing ESP writing proficiency. *Journal of Teaching English for Specific and Academic Purposes*, 11(2), 387-401. <https://doi.org/10.22190/JTESAP230420029M>
- Mohamed, A. (2023). Exploring the potential of an AI-based chatbot (ChatGPT) in enhancing English as a foreign language (EFL) teaching: Perceptions of EFL faculty members. *Education and Information Technologies*, 29 (3), 3195-3217. <https://doi.org/10.1007/s10639-023-11917-z>
- Mohd Nasim, S. (2022). Metacognitive listening comprehension strategies of Arab English language learners. *Education Research International*, 2022 (1), 9916727. <https://doi.org/10.1155/2022/9916727>
- Nasim, S. M., & Mujeeba, S. (2021). Learning styles of Saudi ESP students. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 13(4), 1-17. <https://doi.org/10.21659/rupkatha.v13n4.55>

- Nasim, S. M., AlTameemy, F., & Alhamod, A. (2022). Identifying metacognitive listening comprehension strategies of Saudi ESP students. *FWU Journal of Social Sciences*, 16(2). <http://ojs.sbbwu.edu.pk/fwu-journal/index.php/ojss/article/view/796>
- Özçakmak, H., Köroglu, M., Korkmaz, C., & Bolat, Y. (2021). The effect of metacognitive awareness on academic success. *African Educational Research Journal*, 9(2), 434-448. <https://doi.org/10.30918/AERJ.92.21.020>
- Ozfidan, B., & Mitchell, C. (2020). Detected difficulties in argumentative writing: The case of culturally and linguistically Saudi backgrounded students. *Journal of Ethnic and Cultural Studies*, 7(2), 15-29. <https://doi.org/10.29333/ejecs/382>
- Ramadhanti, D., & Yanda, D. P. (2021). Students' metacognitive awareness and its impact on writing skill. *International Journal of Language Education*, 5(3), 193-206. <https://doi.org/10.26858/ijole.v5i3.18978>
- Razzaq, S., & Hamzah, M. H. (2024). The integration between metacognitive writing strategies and willingness to write: A way to expediate writing performance of Pakistani ESL learners a mixed-methods approach. *Social Sciences & Humanities Open*, 10, 101010. <https://doi.org/10.1016/j.ssaho.2024.101010>
- Santelmann, L. M., Stevens, D. D., & Martin, S. B. (2018). Fostering master's students' metacognition and self-regulation practices for research writing. *College Teaching*, 66(3), 111-123.
- Sarker, M. AL-Muaalemi, M.A. (2022). Sampling techniques for quantitative research. In: Islam, M.R., Khan, N.A., Baikady, R. (eds) *Principles of Social Research Methodology*. Springer. https://doi.org/10.1007/978-981-19-5441-2_15
- Soeharto, S., Martono, M., Hairida, H., Akhmetova, A., Arifiyanti, F., Benő, C., & Charalambos, C. (2024). The metacognitive awareness of reading strategy among pre-service primary teachers and the possibility of rating improvement using Rasch analysis. *Studies in Educational Evaluation*, 80, 101319. <https://doi.org/10.1016/j.stueduc.2023.101319>
- Soto, C., Gutierrez de Blume, A. P., Rebolledo, V., Rodríguez, F., Palma, D., & Gutiérrez, F. (2023). Metacognitive monitoring skills of reading comprehension and writing between proficient and poor readers. *Metacognition and Learning*, 18(1), 113-134. <https://doi.org/10.1007/s11409-022-09317-8>
- Sun, Q., & Zhang, L. J. (2022). Examining the effects of English as a foreign language student-writers' metacognitive experiences on their writing performance. *Current Psychology*, 1-16. <https://doi.org/10.1007/s12144-022-03416-0>
- Sun, T., Wang, C., & Wang, Y. (2022). The effectiveness of self-regulated strategy development on improving English writing: Evidence from the last decade. *Reading and Writing*, 35(10), 2497-2522. <https://doi.org/10.1007/s11145-022-10297-z>
- Teng, L. (2022). Explicit strategy-based instruction in L2 writing contexts: A perspective of self-regulated learning and formative assessment. *Assessing Writing*, 53, 100645. <https://doi.org/10.1016/j.asw.2022.100645>
- Teng, M. F., & Yue, M. (2023). Metacognitive writing strategies, critical thinking skills, and academic writing performance: A structural equation modeling approach. *Metacognition and Learning*, 18(1), 237-260. <https://doi.org/10.1007/s11409-022-09328-5>
- Teng, M. F., Qin, C., & Wang, C. (2022). Validation of metacognitive academic writing strategies and the predictive effects on academic writing performance in a foreign language context. *Metacognition and Learning*, 17(1), 167-190. <https://doi.org/10.1007/s11409-021-09278-4>
- Trapman, M., van Gelderen, A., van Schooten, E., & Hulstijn, J. (2018). Writing proficiency level and writing development of low-achieving adolescents: The roles of linguistic knowledge, fluency, and metacognitive knowledge. *Reading and Writing*, 31, 893-926. <https://doi.org/10.1007/s11145-018-9818-9>
- Villaruz, J. M., & Palma, R. C. (2024). Metacognitive awareness of writing strategies, oral proficiency, and writing instructions: A structural equation model of academic writing skills in Filipino language. *Asian Journal of Advanced Research and Reports*, 18(7), 114-134. <https://doi.org/10.9734/ajarr/2024/v18i7690>
- Wu, M. (2022). The social nature of second language metacognition. *The Asia-Pacific Education Researcher*, 31(5), 499-506. <https://doi.org/10.1007/s40299-021-00596-4>
- Zohar, A., & Ben-Ari, G. (2022). Teachers' knowledge and professional development for metacognitive instruction in the context of higher order thinking. *Metacognition and Learning*, 17(3), 855-895. <https://doi.org/10.1007/s11409-022-09310-1>