

Scaffolding Academic Writing Via Google Drive: A Colour Coded And Step-By-Step Instructional Approach

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ABSTRACT

Academic writing remains a challenging task for many English as a Second Language (ESL) learners because it requires effective planning, idea development, organization, revision, and self-regulation. This study investigates learners' perceptions of scaffolding academic writing via Google Drive using colour codes and a step-by-step method, and examines the relationships among these instructional strategies. Anchored in the Cognitive Process Theory of Writing (Flower & Hayes, 1981), the Technology Acceptance Model (Davis, 1989), Dual Coding Theory (Paivio, 1991), and Scaffolding Theory (Wood, Bruner, & Ross, 1976), the study employed a quantitative survey design. A total of 31 respondents participated by completing a 27-item questionnaire comprising four sections: writing process, Google Drive, colour codes, and step-by-step instructions. Descriptive statistics (mean and standard deviation) and Pearson correlation analyses were conducted using SPSS. The findings revealed that respondents demonstrated highly positive perceptions of all four constructs. Learners reported active engagement in the planning, translating, and reviewing stages of writing, while Google Drive was perceived to enhance collaboration, real-time feedback, and learner engagement. Colour-coding improved attention, organization, and reinforcement of writing concepts, whereas the step-by-step approach reduced cognitive overload and strengthened the logical flow of academic writing. Correlation analysis further indicated significant positive relationships among Google Drive, colour codes, and step-by-step instruction, suggesting that these pedagogical strategies complement one another in supporting academic writing development. The study contributes to the growing body of technology-enhanced writing pedagogy by proposing an integrated scaffolding framework that combines digital collaboration, visual support, and structured instructional guidance. The findings offer valuable implications for educators seeking to design engaging, learner-centred academic writing instruction in higher education.

Keywords: academic writing, scaffolding, Google Drive, colour codes, step-by-step instruction, collaborative learning.

INTRODUCTION

Background of Study

Academic writing is a fundamental component of higher education as it enables students to communicate ideas critically, present evidence systematically, and demonstrate disciplinary knowledge. However, producing a well-organised academic text is a complex cognitive process that requires learners to engage in planning, translating ideas into written form, and reviewing their work before producing a final draft. Many learners, particularly those studying English as a second language (ESL), experience difficulties in organizing ideas, maintaining coherence, paraphrasing information, and revising their writing effectively. With the advancement of educational technology, digital platforms and instructional scaffolding have become increasingly important in supporting students throughout the writing process. In particular, Google Drive offers opportunities for real-time collaboration, immediate feedback, and continuous revision, while colour codes provide visual guidance to reinforce learning, and step-by-step instruction helps simplify complex writing tasks. Together, these

approaches have the potential to create a supportive learning environment that enhances students' academic writing skills and promotes learner autonomy.

Statement of Problem

Despite the growing use of technology in writing instruction, several issues remain. Recent studies have shown that Google Drive and Google Docs improve collaborative writing, organization, and grammatical accuracy through real-time interaction and feedback (Aflahatum & Prihatin, 2018; Simal & Yulia, 2025). Similarly, colour-coding strategies have been found to improve paragraph organization, reduce writing anxiety, and strengthen learners' understanding of essay structure (Azeez, 2021; Zainal Abidin et al., 2022). Furthermore, structured scaffolding techniques such as templates and graphic organisers have been reported to improve learners' writing performance and confidence (Nhung, 2024; Aripin, 2025). Nevertheless, these studies have generally examined Google Drive, colour codes, and scaffolding as separate instructional strategies. Limited attention has been given to how these three approaches can be integrated into a single instructional framework to support the entire academic writing process.

Research Gap

The present study addresses this research gap by investigating scaffolding academic writing via Google Drive using colour codes and the step-by-step Method as an integrated pedagogical approach. Rather than focusing on a single instructional strategy, this study examines learners' perceptions of the writing process, the use of Google Drive, colour codes, and step-by-step scaffolding, as well as the relationships among these instructional elements. By combining technological support with visual and instructional scaffolds, this study extends previous research and contributes to a more comprehensive understanding of how multiple scaffolding strategies can work together to enhance academic writing. The findings are expected to provide practical insights for educators seeking effective and engaging approaches to teaching academic writing in both face-to-face and technology-enhanced learning environments.

Objective of the Study and Research Questions

This study is done to explore learning academic writing via Google Drive. Specifically, this study is done to answer the following questions;

Table 1- Distribution of Research Questions and Research Hypotheses

NO	Research Question	Research Hypothesis
1	How do learners perceive the writing processes in academic writing?	NA
2	How do learners perceive learning academic writing using Google Drive?	NA
3	How do learners perceive learning academic writing using Colour codes?	NA
4	How do learners perceive learning academic writing step-by-step?	NA
5	Are there significant relationships between google drive and colour codes?	H ₀₁ : There are no significant relationships between google drive and colour codes
6	Are there significant relationships between colour codes and step-by-step?	H ₀₂ : There are no significant relationships between colour codes and step-by-step

7	Are there significant relationships between step-by-step and google drive?	H ₀₃ : There are no significant relationships between step-by-step and google drive
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LITERATURE REVIEW

Theoretical Framework of the Study

Cognitive process theory of Writing

The Cognitive Process Theory of Writing, developed by Flower and Hayes (1981), views writing as a complex, recursive, and goal-directed cognitive activity rather than a simple linear process. According to the theory, effective writing involves three major cognitive processes: planning, translating, and reviewing. During the planning stage, writers generate ideas, organize information, and set writing goals. The translating stage involves converting these ideas into written text, while the reviewing stage requires writers to evaluate, revise, and edit their work to improve clarity, coherence, and accuracy. Flower and Hayes also emphasize the role of the writer's working memory, long-term memory, and the writing task environment in shaping the writing process. Since these processes are recursive, writers frequently move back and forth between planning, translating, and reviewing rather than following a fixed sequence. This theory has been widely applied in writing instruction because it highlights the importance of teaching writing as an active process involving strategic thinking, self-regulation, and continuous revision.

Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by Davis (1989), explains how users' acceptance of technology is influenced by two key factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which individuals believe that using a particular technology will improve their performance, while perceived ease of use refers to the degree to which the technology is considered simple and effortless to use. According to TAM, when users perceive a technology as both useful and easy to operate, they are more likely to adopt and continue using it. In the context of learning academic writing, Google Drive aligns well with this theory because it offers user-friendly features such as real-time collaboration, instant feedback, cloud-based document sharing, and automatic saving. These features enhance students' writing efficiency, encourage active participation, and facilitate collaborative learning. As students recognize the benefits and convenience of Google Drive, they are more likely to accept and use the platform to support the planning, drafting, revising, and editing stages of academic writing.

Dual Coding Theory

The Dual Coding Theory, proposed by Paivio (1991), suggests that learning is enhanced when information is processed through two interconnected cognitive systems: the verbal system, which processes words and language, and the non-verbal system, which processes images, colours, and other visual representations. According to the theory, combining verbal and visual information strengthens memory, improves comprehension, and facilitates information retrieval. In the context of learning academic writing, the use of colour codes supports Dual Coding Theory by providing visual cues that complement written text. Different colours can be used to distinguish writing elements such as thesis statements, topic sentences, supporting details, evidence, and conclusions, enabling students to organize ideas more effectively and identify structural patterns. Colour-coding also helps learners focus their attention, reinforces key writing concepts, and reduces cognitive load, making the writing process clearer, more engaging, and easier to understand.

Scaffolding Theory

The Scaffolding Theory, introduced by Wood et al. (1976) explains that learners achieve better outcomes when they receive temporary guidance and support from teachers or more knowledgeable individuals while developing new skills. As learners gain confidence and competence, this support is gradually reduced, enabling them to perform tasks independently. In the context of learning academic writing, scaffolding can be implemented through a step-by-step instructional approach in which students are guided through the stages of

planning, drafting, revising, and editing. Complex writing tasks are broken into manageable steps, allowing students to develop their skills progressively without feeling overwhelmed. This structured guidance enhances understanding, promotes logical organization of ideas, builds writing confidence, and ultimately enables learners to produce coherent and well-developed academic writing independently.

Past Studies Strategies in Learning Academic Writing

Past studies on scaffolding academic writing have highlighted the importance of structured support through Google Drive-based tools, colour-coded strategies, and step-by-step scaffolding methods. One major theme is the use of Google Drive and Google Docs as platforms for collaborative writing. Aflahatum and Prihatin (2018) found that a Google Drive-based learning model effectively improved students' essay-writing skills, particularly when supported by intensive interaction between lecturers and students. Similarly, Simal and Yulia (2025) reported that Google Docs facilitated real-time collaboration, immediate feedback, and group assignments, leading to improvements in writing organization, language use, and grammatical accuracy. Despite challenges such as unstable internet connections and limited formatting features, both studies indicate that Google-based platforms provide valuable technological scaffolds that enhance collaboration, feedback exchange, and digital literacy in academic writing.

A second theme concerns the use of colour codes as scaffolds for writing. Azeez (2021) found that the colour-code strategy significantly improved students' ability to write well-structured academic paragraphs, particularly in terms of organization and paragraph structure. Likewise, Zainal Abidin et al. (2022) explored the use of coloured scaffolds in online academic writing and found that learners perceived colour-based guidance as the most helpful aspect of their writing activities. Participants emphasized the importance of the translating and reviewing stages while reporting that coloured scaffolds reduced anxiety and stress during writing. These findings suggest that colour coding serves as an effective visual scaffold that helps writers organize ideas, understand text structure, and engage more confidently in the writing process.

The third theme focuses on step-by-step scaffolding methods in academic writing. Nhung (2024) demonstrated that structured scaffolding techniques significantly improved students' writing performance, with the use of templates emerging as the most effective strategy. Similarly, Aripin (2025) reported that graphic organizers and scaffolding helped students navigate challenges in planning, drafting, monitoring, and revising academic essays. The findings revealed positive perceptions of scaffolded writing instruction and highlighted the importance of guiding learners throughout the entire writing process. Together, these studies suggest that step-by-step scaffolding provides learners with structured support that enhances writing development, promotes confidence, and facilitates successful academic writing outcomes.

Conceptual Framework of the Study

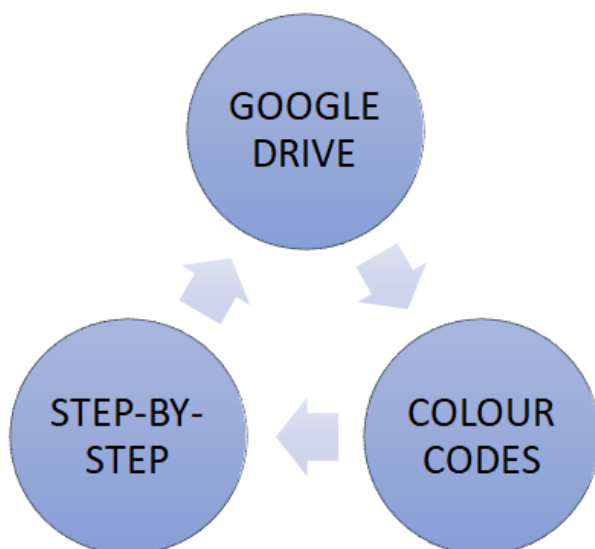


Figure 1- Conceptual Framework of the Study

Figure 1 illustrates the conceptual framework for the study. The framework integrates four complementary learning theories to explain how the proposed instructional approach enhances students' academic writing skills. At the centre of the framework is Google Drive, which functions as the primary digital learning platform supporting collaboration, real-time feedback, document sharing, and continuous revision throughout the writing process. The use of Google Drive is underpinned by the Technology Acceptance Model (TAM) developed by Davis (1989), which posits that learners are more likely to adopt a technology when they perceive it as useful and easy to use. Google Drive's collaborative features, cloud accessibility, and user-friendly interface encourage students to actively participate in planning, drafting, revising, and editing their academic writing. These affordances align with the Cognitive Process Theory of Writing proposed by Flower and Hayes (1981), which views writing as a recursive process involving planning, translating, and reviewing. Through Google Drive, students are able to move flexibly between these cognitive processes while receiving timely support and feedback, thereby improving the quality of their writing.

The framework further incorporates two instructional strategies; colour codes and the step-by-step method—to scaffold students' learning. The use of colour codes is grounded in Paivio's Dual Coding Theory (1991), which suggests that learning is enhanced when verbal information is reinforced with visual representations. By assigning different colours to key writing components, such as thesis statements, topic sentences, supporting details, and conclusions, students can more easily recognise text structure, organise ideas, maintain focus, and reinforce their understanding of academic writing conventions. Meanwhile, the step-by-step method is supported by the Scaffolding Theory of Wood, Bruner, and Ross (1976), which emphasises providing learners with structured guidance until they are able to perform tasks independently. Breaking the writing process into manageable stages reduces students' cognitive load, minimises feelings of overwhelm, and promotes the logical development of ideas. As illustrated in Figure 1, Google Drive, colour codes, and the step-by-step method operate as interconnected instructional elements that collectively scaffold the academic writing process, ultimately fostering greater engagement, improved writing performance, and learner autonomy.

METHODOLOGY

This quantitative pilot study is done to explore the use of Google Drive in learning academic writing. A convenient sample of 31 participants responded to the survey. Table 2 below shows the categories used for the Likert scale; 1 is for Strongly Disagree, 2 is for Disagree, 3 is for Undecided, 4 is for Agree and 5 is for Strongly Agree.

Table 2- Likert Scale Use Frequency

1	Never
2	rarely
3	Sometimes
4	Often
5	Always

Table 3- Distribution of Items in the Survey

SECTION	HEADING/ VARIABLE	CATGEORY	CONSTRUCT	NO OF ITEMS/ INDICATORS	TOT ITEMS
A	WRITING PROCESS & Hayes (1981)	Flower	PLANNING	3	9 (.759)

		TRANSLATING	3	
		REVIEWING	3	
B	USING GOOGLE DRIVE TAM by Davis (1989)	Perceived ease of Use- Real-Time	3	6 (.878)
		Perceived Usefulness- Engaged	3	
C	COLOUR CODES Dual Coding by Pavio (1991)	Attention Focus	3	6 (.821)
		Reinforce Learning	3	
D	STEP-BY-STEP Scaffolding by Wood, et.al (1976)	Reduce Overwhelm	3	6 (.863)
		Logical Flow	3	
				27 (.892)

The instrument (Table 3) used is anchored in several theories. The variable for Writing process is anchored from Flower and Hayes (1981). The variable for the use of Google Drive is anchored from Technology Acceptance Model (TAM) by Davis (1989). The variable for colour codes is anchored from Dual Coding theory by Pavio (1991) and the variable for step-by-step is anchored from Wood, et.al (1976).

Table 4- Reliability Levels, Cronbach's Alpha Ranges, and Their Interpretations (Ahmad,et.al, 2024)

Reliability Level	Cronbach's Alpha range	Interpretation
Excellent	0.9 and above	Indicates very high internal consistency
Good	0.80-0.89	Reflects strong internal consistency
Acceptable	0.70-0.79	Indicates acceptable internal consistency
Questionable	0.60-0.69	Reflects questionable internal consistency
Poor	Below 0.6	Indicates poor internal consistency

Table 3 also shows the reliability of the survey. The analysis shows a Cronbach alpha (refer to Table 4) of .759 for writing process, .878 for Google Drive, .821 for Colour Codes, and .863 for Step-by-Step method. The overall Cronbach alpha for all 27 items is .892; thus, revealing a good reliability of the instrument chosen/used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

FINDINGS

Demographic Analysis

According to Zienefuss, et.al (2021), researchers report demographic data in percentages to establish sample representativeness and allow for generalizability to a larger population. The reporting also provides an overview of participants' characteristics. Percentages offer a clear and understandable picture of the sample makeup.

Table 5- Percentage for Demographic Profile

Question	Demographic Profile	Categories	Percentage (%)
1	Gender	Male	40%
		Female	60%
2	Perceived Writing Proficiency	Below Average	42%
		Above Average	58%
3	Learning Mode Preference	Face-to-Face	68%
		Online	32%

Table 5 above shows the percentage for the demographic profile. 40% of the respondents and male students while 60% are female. Next, 42% reported they had below-average writing proficiency and 58% perceived they had above-average proficiency. Lastly, 68% of the respondents preferred face-to-face classes for academic writing. 32% of the students preferred online classes to learn academic writing.

Descriptive Statistics

Why is there a need to report the mean and standard deviation? According to Vetter (2017), Mean (M) represents the average, or centre of a data set. Standard deviation (SD) indicates the typical distance of individual observations from the mean which shows the data's variability or spread. A low SD means the data points are clustered close to the mean while a high SD indicates they are more spread out. It is good to have a high SD.

Findings for Writing Processes

This section presents data to answer Research Question 1: How do learners perceive the writing processes in academic writing? In the context of this study, this is measured by (i) Planning, (ii) Translating, and (iii) Reviewing.

Table 6- Mean (M) and Standard Deviation (SD) for Planning

ITEM/INDICATOR	M	SD
PQ1 I try to guess possible main ideas before I begin writing my academic paper.	4.29	0.69
PQ2 I use mind maps to organize and develop my ideas during the planning stage.	4.10	0.83
PQ3 I plan my writing by outlining paragraphs before starting the actual draft.	4.35	0.75

Table 6 presents the mean (M) and standard deviation (SD) scores for the planning strategies used by respondents in academic writing. Overall, the results indicate a high level of engagement in planning activities, with mean scores ranging from 4.10 to 4.35. The highest-rated item was planning by outlining paragraphs before beginning the actual draft (M = 4.35, SD = 0.75), followed closely by trying to predict possible main ideas before writing (M = 4.29, SD = 0.69). Using mind maps to organize and develop ideas received the lowest mean score (M = 4.10, SD = 0.83), although it still reflected a high level of agreement. The relatively low standard deviation values suggest that respondents' responses were generally consistent across all planning strategies.

Table 7- Mean (M) and Standard Deviation (SD) for Translating (T)

ITEM/INDICATOR	M	SD
TQ1 I am able to understand the requirements and demands of the essay question before I begin writing.	4.23	0.72
TQ2 I can effectively translate ideas from reading materials into my own words in my essay.	3.40	0.66
TQ3 I gather and organize relevant ideas from different sources before transforming them into written content .	4.13	0.67

Table 7 presents the mean (M) and standard deviation (SD) scores for respondents' translating strategies in academic writing. The findings indicate generally positive use of translating strategies, with mean scores ranging from 3.40 to 4.23. The highest-rated item was understanding the requirements and demands of the essay question before writing (M = 4.23, SD = 0.72), followed by gathering and organizing relevant ideas from different sources before transforming them into written content (M = 4.13, SD = 0.67). In contrast, effectively translating ideas from reading materials into respondents' own words received the lowest mean score (M = 3.40, SD = 0.66), suggesting that paraphrasing remains a comparatively more challenging aspect. The relatively low standard deviation values indicate that respondents showed fairly consistent responses across all items.

Table 8- Mean (M) and Standard Deviation (SD) for Reviewing ®

ITEM/INDICATOR	M	SD
RQ1 I carefully review the ideas in my essay to ensure they are clear and well-developed.	4.39	0.62
RQ2 I check the overall plan and structure of my essay to ensure coherence and logical organization.	4.35	0.61
RQ3 I revise the language aspects of my writing , such as grammar, vocabulary, and sentence structure, to improve quality.	4.23	0.56

Table 8 presents the mean (M) and standard deviation (SD) scores for respondents' reviewing strategies in academic writing. The results indicate a consistently high level of engagement in reviewing practices, with mean scores ranging from 4.23 to 4.39. The highest-rated item was carefully reviewing essay ideas to ensure they are clear and well-developed (M = 4.39, SD = 0.62), followed closely by checking the overall plan and structure for coherence and logical organization (M = 4.35, SD = 0.61). Revising language aspects, including grammar, vocabulary, and sentence structure, also received a high mean score (M = 4.23, SD = 0.56). The relatively low standard deviation values indicate that respondents' responses were highly consistent across all reviewing strategies.

Findings for Google Drive

This section presents data to answer Research Question 2: How do learners perceive learning academic writing using Google Drive? In the context of this study, this is measured by (i) real-time and (ii) student engagement.

Table 9- Mean (M) and Standard Deviation (SD) for Real-Time

ITEM/INDICATOR	M	SD
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GDQ1 Google Drive enables me to receive immediate feedback while working on academic writing tasks.	4.39	0.72
GDQ2 I can make real-time edits and improvements to my writing using Google Drive.	4.55	0.57
GDQ3 Using Google Drive allows me to collaborate instantly with others during the writing process.	4.55	0.62

Table 9 presents the mean (M) and standard deviation (SD) scores for respondents' perceptions of Google Drive's real-time features in supporting academic writing. The findings reveal a very high level of agreement, with mean scores ranging from 4.39 to 4.55. Both the ability to make real-time edits and improvements (M = 4.55, SD = 0.57) and the opportunity to collaborate instantly with others during the writing process (M = 4.55, SD = 0.62) received the highest ratings. Receiving immediate feedback while working on academic writing tasks was also highly rated (M = 4.39, SD = 0.72). The relatively low standard deviation values indicate that respondents' perceptions were consistent across all real-time collaboration features.

Table 10- Mean (M) and Standard Deviation (SD) for Student Engagement

ITEM/INDICATOR	M	SD
GDQ4 Google Drive encourages active participation in academic writing activities.	4.45	0.62
GDQ5 I feel more motivated to engage in writing tasks when using Google Drive.	4/39	0.67
GDQ6 The interactive features in Google Drive increase my involvement in academic writing.	4.32	0.70

Table 10 presents the mean (M) and standard deviation (SD) scores for student engagement when using Google Drive in academic writing. The results indicate a high level of agreement, with mean scores ranging from 4.32 to 4.45. The highest-rated item was that Google Drive encourages active participation in academic writing activities (M = 4.45, SD = 0.62), followed by increased motivation to engage in writing tasks when using Google Drive (M = 4.39, SD = 0.67). Respondents also agreed that the interactive features of Google Drive increased their involvement in academic writing (M = 4.32, SD = 0.70). The relatively low standard deviation values suggest that respondents demonstrated consistent perceptions regarding Google Drive's role in enhancing student engagement.

Findings for Colour Codes

This section presents data to answer Research Question 3: How do learners perceive learning academic writing using Colour codes? In the context of this study, this is measured by (i) focus and (ii) reinforced learning.

Table 11- Mean (M) and Standard Deviation (SD) for Focus

ITEM/INDICATOR	M	SD
CCQ1 Using colour-codes helps me focus on different parts of my academic writing.	4.48	0.57
CCQ2 Colour-coding makes it easier for me to organize ideas and structure my writing clearly.	4.61	0.50
CCQ3 I can concentrate better on my writing tasks when colour-codes are used.	4.48	0.63

Table 11 presents the mean (M) and standard deviation (SD) scores for the focus dimension of using colour-codes in academic writing. The findings indicate a very high level of agreement among respondents, with

mean scores ranging from 4.48 to 4.61. The highest-rated item was that colour-coding makes it easier to organize ideas and structure writing clearly ($M = 4.61$, $SD = 0.50$). Both using colour-codes to focus on different parts of academic writing ($M = 4.48$, $SD = 0.57$) and improving concentration during writing tasks ($M = 4.48$, $SD = 0.63$) also received very high ratings. The low standard deviation values suggest that respondents shared consistent perceptions regarding the effectiveness of colour-coding in enhancing focus during academic writing.

Table 12- Mean (M) and Standard Deviation (SD) for Reinforce learning

ITEM/INDICATOR	M	SD
CCQ4 Colour-codes help me remember key writing concepts more effectively.	4.48	0.57
CCQ5 Using colours strengthens my understanding of grammar, structure, and content in writing.	4.32	0.60
CCQ6 Colour-coding enhances my learning by making writing elements easier to recognise and apply.	4.42	0.62

Table 12 presents the mean (M) and standard deviation (SD) scores for the role of colour-coding in reinforcing learning during academic writing. The results indicate a high level of agreement among respondents, with mean scores ranging from 4.32 to 4.48. The highest-rated item was that colour-codes help respondents remember key writing concepts more effectively ($M = 4.48$, $SD = 0.57$), followed by the perception that colour-coding enhances learning by making writing elements easier to recognize and apply ($M = 4.42$, $SD = 0.62$). Using colours to strengthen understanding of grammar, structure, and content also received a high mean score ($M = 4.32$, $SD = 0.60$). The relatively low standard deviation values indicate consistent responses across all items.

Findings for Step-by-Step

This section presents data to answer Research Question 4: How do learners perceive learning academic writing step-by-step? In the context of this study, this is measured by (i) reducing overwhelm and (ii) logical flow.

Table 13- Mean (M) and Standard Deviation (SD) for Reduced Overwhelm

ITEM/INDICATOR	M	SD
SSQ1 Learning academic writing step-by-step makes the process feel less overwhelming.	4.61	0.56
SSQ2 Breaking writing tasks into smaller steps helps me manage my workload more effectively.	4.38	0.72
SSQ3 I feel less stressed when academic writing is taught in a step-by-step manner.	4.19	0.72

Table 13 presents the mean (M) and standard deviation (SD) scores for the reduced overwhelm dimension of step-by-step instruction in academic writing. The findings indicate a high level of agreement among respondents, with mean scores ranging from 4.19 to 4.61. The highest-rated item was that learning academic writing step-by-step makes the process feel less overwhelming ($M = 4.61$, $SD = 0.56$). This was followed by the belief that breaking writing tasks into smaller steps helps manage workload more effectively ($M = 4.38$, $SD = 0.72$). Respondents also agreed that step-by-step instruction reduces stress during academic writing ($M = 4.19$, $SD = 0.72$). The relatively low standard deviation values suggest that respondents' perceptions were generally consistent across all items.

Table 14- Mean (M) and Standard Deviation (SD) for Logical Flow

ITEM/INDICATOR	M	SD
SSQ4 A step-by-step approach helps me organize my ideas in a clear and logical sequence.	4.19	1.05
SSQ5 Following structured steps improves the coherence of my academic writing.	4.55	0.62
SSQ6 Step-by-step guidance helps me develop a stronger logical flow in my writing.	4.4	0.62

Table 14 presents the mean (M) and standard deviation (SD) scores for the logical flow dimension of step-by-step instruction in academic writing. The results indicate a high level of agreement among respondents, with mean scores ranging from 4.19 to 4.55. The highest-rated item was that following structured steps improves the coherence of academic writing (M = 4.55, SD = 0.62), followed by the view that step-by-step guidance helps develop a stronger logical flow in writing (M = 4.40, SD = 0.62). Organizing ideas in a clear and logical sequence received the lowest mean score (M = 4.19, SD = 1.05), with the higher standard deviation suggesting greater variation in respondents' views on this aspect.

Exploratory Statistics

According to He (2024), correlation is a statistical technique that shows how strongly two variables are related to each other or the degree of association between the two. It's a common tool for describing simple relationships without making a statement about cause and effect. This section presents data to answer the research question on correlation.

To determine if there is a significant association in the mean scores between all types of teaching methods, data is analyzed using SPSS for correlations. Results are presented separately in Table 13 below. According to He (2024), the coefficient is significant at the .05 level and a positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0.

Table 15- Correlation between all types of teaching methods

Correlations				
		GOOGLE DRIVE	COLOUR CODES	STEP-BY-STEP
GOOGLE DRIVE	Pearson Correlation	1	.533**	.363*
	Sig. (2-tailed)		.002	.045
	N	31	31	31
COLOUR CODES	Pearson Correlation	.533**	1	.725**
	Sig. (2-tailed)	.002		<.001
	N	31	31	31
STEP-BY-STEP	Pearson Correlation	.363*	.725**	1
	Sig. (2-tailed)	.045	<.001	
	N	31	31	31

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

*. Correlation is significant at the 0.05 level (2-tailed).

Findings for the Relationship between the Writing Process and Google Drive

This section presents data to answer the research question 5: Are there significant relationships between Google Drive and colour codes?

H₀₁: There are no significant relationships between Google Drive and colour codes

Table 15 shows there is an association between Google Drive and colour codes. Correlation analysis shows that there is a high significant association between social support and expectancy components ($r=.533^{**}$) and ($p<.001$). This means that there is also a strong positive relationship between Google Drive and colour codes

Findings for the Relationship between the Writing Process and Google Drive

This section presents data to answer the research question 6: Are there significant relationships between colour codes and step-by-step?

H₀₂: There are no significant relationships between colour codes and step-by-step

Table 15 also shows there is an association between colour codes and step-by-step. Correlation analysis shows that there is a high significant association between social support and expectancy components ($r=.725^{**}$) and ($p<.001$). This means that there is also a strong positive relationship between colour codes and step-by-step.

Findings for the Relationship between the Writing Process and Google Drive

This section presents data to answer the research question 7: Are there significant relationships between step-by-step and google drive?

H₀₃: There are no significant relationships between step-by-step and google drive

Table 15 also shows there is an association between step-by-step and google drive. Correlation analysis shows that there is a high significant association between social support and expectancy components ($r=.725^{**}$) and ($p<.001$). This means that there is also a strong positive relationship between step-by-step and google drive.

CONCLUSION

Summary of Findings and Discussions

This study explored learners' perceptions of scaffolding academic writing via Google Drive using colour codes and a step-by-step method. Overall, the findings revealed highly positive perceptions across all four variables investigated, namely the writing process, Google Drive, colour codes, and the step-by-step approach. Respondents demonstrated strong engagement in the planning, translating, and reviewing stages of writing, supporting the Cognitive Process Theory of Writing by Flower and Hayes (1981), which views writing as a recursive process involving continuous planning, translating, and reviewing. Participants also perceived Google Drive as an effective platform for academic writing due to its real-time editing, collaboration, and feedback features, consistent with the Technology Acceptance Model (Davis, 1989), which proposes that technology adoption depends on perceived usefulness and ease of use. Similarly, respondents highly valued the use of colour codes for improving focus, organization, and learning reinforcement, supporting Paivio's Dual Coding Theory (1991). In addition, the step-by-step approach was perceived to reduce cognitive overload and improve the logical flow of writing, reflecting the principles of Scaffolding Theory (Wood, Bruner, & Ross, 1976). Correlation analysis further showed significant positive relationships among Google Drive, colour codes, and the step-by-step method, suggesting that these instructional strategies complement one another in

supporting academic writing. These findings are consistent with previous studies by Aflahatum and Prihatin (2018) and Simal and Yulia (2025) on the benefits of Google Drive, Azeez (2021) and Zainal Abidin et al. (2022) on the effectiveness of colour-coded writing instruction, and Nhung (2024) and Aripin (2025) on the positive impact of scaffolded, step-by-step writing instruction.

Implications and Suggestions for Future Research

The findings of this study have several important pedagogical implications. First, they suggest that integrating Google Drive into academic writing instruction can enhance collaboration, learner engagement, and immediate feedback, creating a more interactive writing environment. Second, incorporating colour-coded instructional strategies can help students better understand essay structure, improve attention, and strengthen retention of writing concepts. Third, adopting a step-by-step scaffolding approach enables learners to complete complex writing tasks more confidently by reducing cognitive load and promoting logical organization. Collectively, these strategies provide writing instructors with a practical framework for supporting learners throughout the writing process while fostering greater learner autonomy. Future research should involve larger and more diverse samples from different educational institutions to improve the generalizability of the findings. Researchers may also employ experimental or mixed-methods designs to examine the effectiveness of these scaffolding strategies on actual writing performance rather than perceptions alone. In addition, future studies could investigate the integration of emerging technologies, such as artificial intelligence-assisted writing tools or other collaborative digital platforms, alongside Google Drive to further enhance academic writing instruction and learner outcomes.

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