

EVALUATING THE D-E-E-P COGNITIVE ESSAY WRITING FRAMEWORK AMONG CORPORATE ADMINISTRATION STUDENTS

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Abstract. Essay writing remains one of the most widely used assessment methods in higher education, yet many students encounter difficulties in organizing ideas, developing arguments, and demonstrating critical thinking in examination settings. To address these challenges, this study introduced the D-E-E-P Cognitive Essay Writing Framework, a teaching innovation designed to guide students in constructing essay responses through four stages: Definition, Explanation, Example, and Point of Significance. The framework aims to provide a structured approach to essay writing while reducing cognitive burden during examinations. This study employed an explanatory sequential mixed-methods design involving 47 undergraduate students. Quantitative data were collected through pre- and post-intervention assessments conducted over one academic semester, while qualitative data were obtained through semi-structured interviews with seven students. The quantitative findings revealed an improvement in students' essay-writing performance, with the overall mean score increasing from 2.96 to 3.20. The qualitative findings further indicated that the framework enhanced answer organization and structure, improved critical thinking and content elaboration, and increased confidence in examination writing. The integration of both quantitative and qualitative findings suggests that the D-E-E-P framework serves as an effective cognitive scaffold that supports students in producing more structured, analytical, and comprehensive examination essays. The study contributes to pedagogical innovation by offering a practical and transferable framework that can be applied across disciplines requiring essay-based assessments.

Keywords: *teaching innovation, critical thinking, student development, higher education, pedagogy*

Introduction

Essay writing remains a central component of assessment in higher education because it provides an effective mechanism for evaluating students' conceptual understanding, critical thinking, analytical reasoning, and communication abilities. Unlike objective forms of assessment that primarily measure knowledge recall, essay-based assessments require students to synthesize information, construct coherent arguments, establish relationships among concepts, and demonstrate higher-order cognitive skills. Consequently, essay writing is widely regarded as an essential academic competency that contributes not only to assessment performance but also to students' intellectual development and disciplinary learning (Wingate, 2012). Research further indicates that writing serves as a powerful learning tool because it promotes deeper cognitive processing, knowledge integration, and conceptual understanding

across various subject domains (Graham et al., 2020). Despite its importance, essay writing remains one of the most challenging academic tasks for university students. Numerous studies have reported that students frequently experience difficulties in organizing ideas, developing arguments, integrating evidence, and articulating their understanding in a structured and coherent manner (Graham et al., 2018; Wingate, 2012). These challenges become particularly evident during examinations where students are required to generate complete responses within strict time constraints. Although many students possess adequate subject knowledge, they often struggle to transform that knowledge into well-developed written answers that satisfy academic expectations. As a result, examination performance may not accurately reflect students' actual understanding but rather their ability to organize and communicate ideas effectively.

The complexity of essay writing stems from the fact that it requires the simultaneous activation of multiple cognitive processes. Students must retrieve relevant information from memory, evaluate the relevance of that information, organize ideas logically, develop supporting arguments, and communicate their thoughts in a coherent written form. According to Graham et al. (2020), writing activities facilitate learning because they engage learners in cognitive operations involving analysis, synthesis, and knowledge transformation. Similarly, evidence from meta-analytic research demonstrates that interventions designed to strengthen literacy-related processes contribute significantly to improvements in writing quality and academic performance (Graham et al., 2018). These findings indicate that successful writing extends beyond linguistic proficiency and represents a complex cognitive process that requires explicit instructional support. Such support plays a crucial role in human capital development by fostering knowledge acquisition, strengthening competencies, and enhancing higher-order thinking and communication skills essential for academic and professional success (Awalluddin, 2019). The growing emphasis on higher-order thinking skills within contemporary higher education further highlights the need for effective essay-writing pedagogies. Universities increasingly expect students to move beyond descriptive responses and demonstrate analytical, evaluative, and reflective thinking in their assessments. However, many students continue to rely heavily on memorization-oriented approaches that prioritize factual recall over conceptual understanding and critical analysis (Ogunleye et al., 2024; Xia et al., 2024). This situation creates a persistent gap between institutional expectations and students' actual performance. Furthermore, traditional teaching approaches often focus extensively on content delivery while providing limited guidance regarding how students should structure their examination responses (Buckley, 2024). Consequently, students may understand what to learn but remain uncertain about how to present their knowledge effectively during assessments.

Scholars have increasingly argued that explicit instructional frameworks and cognitive scaffolding strategies are necessary to support students' writing development. Academic writing research emphasizes that students benefit significantly from structured guidance that makes the processes of planning, organizing, and constructing arguments more visible and manageable (Wingate, 2012). Similarly, writing interventions that provide systematic procedural support have been shown to enhance writing quality, promote deeper learning, and improve academic achievement (Graham et al., 2020; 2018). Recent evidence also suggests that structured instructional approaches can improve students' ability to manage the cognitive demands associated

with academic writing by reducing cognitive overload and facilitating logical organization of ideas (Li and Zhang, 2026). Collectively, these findings highlight the importance of developing practical frameworks that help students convert knowledge into coherent written responses. Although substantial research has examined academic writing instruction, much of the literature focuses on extended writing tasks such as essays, reports, research papers, and coursework assignments (Awalluddin et al., 2026). Comparatively less attention has been devoted to structured frameworks specifically designed for examination-oriented essay writing. Examination contexts differ substantially from conventional writing tasks because students have limited opportunities for planning, drafting, revising, and editing. Under such conditions, students require concise and memorable cognitive strategies that can be applied rapidly during assessment situations. The absence of such structured examination-answering frameworks represents an important pedagogical gap in the literature.

To address this gap, the present study introduces the D-E-E-P Cognitive Essay Writing Framework, an instructional innovation designed to improve students' ability to construct comprehensive and analytically rich examination essays. The framework comprises four sequential components: Definition, Explanation, Example, and Point of Significance (D-E-E-P). The Definition stage establishes conceptual clarity, the Explanation stage develops understanding of the concept, the Example stage demonstrates contextual application, and the Point of Significance stage encourages students to articulate the implications, relevance, or importance of the concept under discussion. By guiding students through these interconnected cognitive processes, the framework provides a systematic mechanism for transforming subject knowledge into structured and meaningful examination responses. The theoretical contribution of the D-E-E-P framework lies in its integration of cognitive learning principles, writing-to-learn theory, and structured academic writing practices into a practical examination-answering strategy. Unlike many conventional writing approaches that focus primarily on producing lengthy academic texts, D-E-E-P emphasizes rapid cognitive organization and logical response construction within time-constrained assessment environments. Consequently, the framework has the potential to enhance not only students' writing performance but also their critical thinking, conceptual understanding, and overall academic achievement. In an educational landscape increasingly characterized by the demand for higher-order thinking and effective communication, the development of structured cognitive writing frameworks such as D-E-E-P represents a timely and valuable pedagogical innovation.

Literature review

Academic essay writing in higher education

Academic essay writing constitutes one of the most fundamental competencies expected of students in higher education. Beyond serving as a mechanism for assessment, academic writing functions as a medium through which students develop critical thinking, construct knowledge, and communicate disciplinary understanding. Universities across disciplines utilize essay-based assessments to evaluate students' ability to synthesize information, formulate arguments, and demonstrate conceptual understanding beyond the mere recall of facts. Consequently, the ability to produce coherent and analytically rich essays has become an important indicator of academic achievement and intellectual development. Scholars have consistently emphasized that

writing is not merely a method of reporting knowledge but a cognitive process that contributes directly to learning. Graham et al. (2020), writing activities promote learning by encouraging students to engage in higher-order cognitive processes such as analysis, synthesis, evaluation, and reflection. Their meta-analysis involving 56 experimental studies found that writing-to-learn activities significantly enhanced student learning across science, social studies, and mathematics, highlighting the role of writing as a cognitive tool rather than simply a communication skill. These findings support the notion that writing facilitates knowledge construction and deeper conceptual understanding.

The relationship between literacy development and writing performance has also received considerable scholarly attention. Graham et al. (2018) demonstrated through a meta-analysis that reading interventions positively influence writing performance, suggesting that writing development is closely associated with students' ability to engage with and process textual information. Their findings indicate that students who develop stronger literacy skills are better equipped to organize ideas, develop arguments, and communicate their understanding effectively in written form. This evidence reinforces the view that academic writing is a complex activity requiring the integration of multiple cognitive and literacy-related competencies. Within higher education, academic writing is increasingly viewed as a disciplinary practice rather than a generic skill. Wingate (2012) argues that successful academic writing requires students to understand the conventions, expectations, and epistemological assumptions of their respective disciplines. Students are expected not only to present information but also to engage critically with ideas, justify claims using evidence, and construct logically coherent arguments. However, many students enter higher education without sufficient understanding of these academic conventions, resulting in difficulties when producing written assignments and examination essays. Wingate further contends that writing instruction should move beyond remedial language support and instead provide explicit guidance on disciplinary ways of thinking and argument construction.

Research also suggests that structured support mechanisms can significantly improve academic writing outcomes. Huisman et al. (2019), in their meta-analysis of peer feedback in higher education writing tasks, reported that students who engaged in structured peer-feedback activities demonstrated significantly greater improvements in writing performance than those who received no feedback. Such findings indicate that writing quality can be enhanced when students are provided with systematic opportunities to evaluate, refine, and reorganize their ideas. Although peer-feedback approaches have shown positive outcomes, their implementation often occurs within coursework environments where students have sufficient time for revision and reflection. Despite the extensive body of literature supporting the educational value of writing, challenges remain regarding students' ability to produce effective examination essays. Existing writing pedagogies largely emphasize drafting, revising, and iterative feedback processes, which may not be fully applicable to examination contexts where responses must be generated rapidly under time constraints. Furthermore, many writing frameworks focus primarily on improving written communication rather than facilitating cognitive organization during assessments. As higher education increasingly emphasizes higher-order thinking and authentic assessment, there is a growing need for instructional frameworks that help students transform content knowledge into coherent, analytical, and examination-oriented written responses. This need provides the

foundation for exploring structured cognitive approaches to essay writing, such as the proposed D-E-E-P Cognitive Essay Writing Framework.

Challenges in examination essay writing

Despite the recognized importance of academic writing in higher education, many students continue to experience substantial difficulties when responding to essay-based examination questions. Examination essays differ considerably from coursework assignments because they require students to retrieve information, organize ideas, construct arguments, and communicate their understanding within a limited timeframe. Consequently, examination essay writing represents a complex cognitive activity that places significant demands on students' knowledge, reasoning abilities, and writing skills. Although students may possess adequate content knowledge, they frequently struggle to demonstrate their understanding effectively in written examinations, resulting in a discrepancy between what they know and what they are able to communicate. One of the most commonly reported challenges is the inability to organize ideas into coherent and logical arguments. Academic writing requires students to establish clear relationships between concepts, develop supporting explanations, and justify claims using appropriate evidence. However, many students produce fragmented responses characterized by disconnected ideas, insufficient elaboration, and weak argument development (Wingate, 2012). Such difficulties are particularly problematic in examination settings where students must make rapid decisions regarding the selection, sequencing, and presentation of information. As a result, students often provide descriptive rather than analytical responses, limiting their ability to demonstrate higher-order thinking skills.

Another significant challenge concerns the cognitive complexity associated with writing. Writing is widely regarded as a demanding cognitive process because it requires the simultaneous coordination of multiple mental activities, including planning, information retrieval, organization, monitoring, and revision. Graham et al. (2020) argue that effective writing involves the transformation of knowledge rather than the simple reproduction of memorized information. Students must therefore engage in complex cognitive operations to construct meaningful responses. Under examination conditions, these demands become even more pronounced because students have limited opportunities to plan, revise, or refine their work. Consequently, many students experience cognitive overload, which negatively affects the quality and coherence of their responses. The influence of cognitive load on academic performance has been extensively discussed within educational research. According to Cognitive Load Theory, learners possess a limited working memory capacity that can easily become overwhelmed when performing complex tasks (Sweller, 1988). Examination essay writing requires students to simultaneously manage content knowledge, question interpretation, argument development, and linguistic expression. When cognitive demands exceed available cognitive resources, students may struggle to process information effectively, resulting in incomplete explanations, poorly structured arguments, and superficial discussions. Paas et al. (2003) further suggest that instructional strategies should be designed to reduce unnecessary cognitive load and facilitate more efficient knowledge processing. These insights highlight the importance of structured approaches that can support students during examination situations.

Time pressure represents an additional challenge unique to examination contexts. Unlike coursework assignments, which allow students to engage in drafting, revision,

and consultation, examination essays must be completed within strict time constraints. Research on academic writing suggests that effective writing often involves recursive processes of planning, drafting, reviewing, and editing (Graham and Sandmel, 2011). However, such processes are difficult to implement during examinations, where students are expected to produce polished responses in a single sitting. Consequently, many students adopt memorization-based approaches that prioritize information recall rather than conceptual understanding and critical analysis. While memorization may facilitate the reproduction of factual knowledge, it often fails to support the development of coherent and persuasive arguments required in higher education assessments (Fawzia and Karim, 2024). Furthermore, students frequently encounter difficulties in understanding what examiners expect in high-quality essay responses. Wingate (2012) argues that academic writing conventions are often implicit rather than explicitly taught, leaving students uncertain about how to structure their arguments and demonstrate analytical thinking. This issue is particularly problematic for novice learners who may understand subject content but lack the procedural knowledge necessary to present their ideas effectively (Wingate, 2012). As a result, students may include relevant information without adequately explaining its significance or relationship to the question being addressed.

Although various writing interventions have demonstrated positive effects on writing performance, many are designed primarily for coursework environments involving extended writing tasks, peer feedback, and iterative revision processes (Huisman et al., 2019). Comparatively less attention has been given to the development of concise and practical frameworks specifically intended for examination essay writing. This limitation represents an important gap within the literature. Students require structured cognitive strategies that can assist them in organizing ideas, developing explanations, providing relevant examples, and articulating the significance of their arguments under time-constrained conditions. Addressing this need is essential for improving students' examination performance and fostering higher-order thinking skills. Therefore, the development of a structured cognitive framework such as the D-E-E-P Cognitive Essay Writing Framework may provide a practical solution to the challenges associated with examination essay writing.

Cognitive learning theory and cognitive load

Cognitive Learning Theory provides an important theoretical foundation for understanding how students acquire, process, organize, and retrieve information during learning activities. Unlike behaviourist perspectives that emphasize observable responses to external stimuli, cognitive learning perspectives focus on the internal mental processes involved in knowledge acquisition and problem solving (Schunk and DiBenedetto, 2020). Learning is viewed as an active process whereby individuals construct meaning by connecting new information with existing cognitive structures. Within higher education, this perspective is particularly relevant because students are frequently required to engage in complex intellectual tasks that involve analysis, synthesis, evaluation, and application of knowledge. Academic writing, especially in examination contexts, represents one such cognitively demanding activity because students must simultaneously retrieve information, organize ideas, construct arguments, and communicate their understanding effectively (Mayer, 2020). One of the central assumptions of cognitive learning theory is that meaningful learning occurs when information is organized into coherent cognitive structures that facilitate understanding

and retrieval. According to information processing perspectives, learning involves the movement of information from sensory memory to working memory and ultimately into long-term memory, where knowledge is stored and organized for future use (Baddeley et al., 2020). The effectiveness of learning therefore depends not only on the amount of information acquired but also on how efficiently that information is structured and retrieved during task performance. In the context of examination essay writing, students must rapidly access relevant knowledge from long-term memory and organize it into coherent written responses (Fiorella and Mayer, 2016). Consequently, difficulties in organizing knowledge may hinder performance even when students possess adequate subject-matter understanding.

The concept of cognitive load provides further insight into the challenges associated with complex learning tasks. Cognitive Load Theory (CLT), introduced by Sweller (1988), argues that human working memory possesses limited processing capacity. When learners are required to process excessive amounts of information simultaneously, working memory can become overloaded, resulting in reduced learning effectiveness and poorer task performance. This limitation is particularly relevant in educational settings where students are expected to solve problems, analyze information, and construct arguments under demanding conditions. Sweller (1988) stated that instructional approaches should therefore be designed to minimize unnecessary cognitive burden and support efficient information processing. The application of Cognitive Load Theory has gained substantial support within educational research. Paas et al. (2003) argue that instructional designs should facilitate learning by reducing extraneous cognitive load and directing learners' attention toward essential cognitive processes. Extraneous cognitive load refers to mental effort imposed by inefficient instructional methods, whereas germane cognitive load contributes positively to schema construction and learning. Effective instructional strategies therefore aim to reduce unnecessary mental effort while promoting meaningful cognitive engagement. In the context of examination essay writing, students often experience high cognitive demands because they must simultaneously interpret questions, recall relevant information, organize ideas, develop arguments, and monitor their writing. Such competing cognitive requirements can overwhelm working memory and negatively affect the quality of written responses.

Research on writing and learning further supports the relationship between cognitive processing and academic performance. Graham et al. (2020) found that writing activities promote learning because they require students to transform knowledge through processes of analysis, synthesis, and reflection. Rather than functioning solely as a communication tool, writing serves as a mechanism for organizing and restructuring knowledge. Similarly, Graham et al. (2018) demonstrated that literacy-related interventions can improve writing performance by strengthening the cognitive processes involved in comprehension and knowledge construction. These findings suggest that instructional approaches capable of supporting cognitive organization may contribute significantly to students' writing effectiveness. The relevance of cognitive learning principles becomes particularly apparent in examination settings. Examination essays require students to generate responses within limited time constraints, leaving little opportunity for extensive planning or revision. Consequently, students who lack structured cognitive strategies may struggle to organize their thoughts effectively, resulting in fragmented responses and incomplete arguments (Sweller et al., 2019). From a cognitive perspective, the challenge is not merely a lack of knowledge but rather

the inability to manage cognitive resources efficiently during task performance (Kirschner et al., 2018). Structured frameworks can therefore function as cognitive aids that reduce mental burden by providing a clear sequence for organizing information and constructing responses.

Within the context of the present study, the D-E-E-P Cognitive Essay Writing Framework can be understood as a cognitive support mechanism grounded in Cognitive Learning Theory and Cognitive Load Theory. By guiding students through sequential stages of Definition, Explanation, Example, and Point of Significance, the framework provides an organized pathway for knowledge retrieval and response construction. Such a structure may reduce cognitive overload by simplifying the decision-making process involved in essay writing while simultaneously encouraging deeper cognitive engagement with the subject matter. Rather than requiring students to independently determine how ideas should be organized, the framework offers a systematic approach that promotes conceptual understanding, logical argument development, contextual application, and analytical interpretation. Consequently, the D-E-E-P framework aligns with contemporary cognitive theories that emphasize structured learning, efficient information processing, and meaningful knowledge construction as essential components of academic success. The literature on cognitive learning and cognitive load therefore provides a strong theoretical justification for the development of structured instructional innovations designed to support academic writing. Given the cognitive demands associated with examination essay writing, frameworks that facilitate knowledge organization and reduce unnecessary cognitive burden may enhance students' ability to produce coherent, comprehensive, and analytically rich responses. This theoretical foundation supports the proposition that the D-E-E-P Cognitive Essay Writing Framework can serve as an effective pedagogical tool for improving examination essay performance in higher education.

D-E-E-P cognitive essay writing framework

The D-E-E-P Cognitive Essay Writing Framework is a structured instructional innovation designed to assist students in constructing comprehensive, coherent, and analytical examination essays. The framework was developed in response to the challenges identified in academic writing literature, particularly students' difficulties in organizing ideas, elaborating arguments, and demonstrating higher-order thinking within time-constrained examination settings. Grounded in Cognitive Learning Theory and Cognitive Load Theory, the framework provides a systematic sequence that guides students through the process of transforming content knowledge into meaningful written responses. The D-E-E-P framework consists of four interconnected components; Definition, Explanation, Example, and Point of Significance. The first component, Definition, requires students to clearly define or identify the key concept related to the examination question. This stage promotes conceptual clarity and ensures that students establish a strong foundation for subsequent discussion. The second component, Explanation, encourages students to elaborate on the concept by describing its characteristics, mechanisms, functions, or implications. Through explanation, students move beyond simple recall and demonstrate a deeper understanding of the topic.

The third component, Example, requires students to provide relevant illustrations, applications, or real-world situations that support the explanation. The use of examples facilitates contextual understanding and enables students to demonstrate the practical relevance of theoretical concepts. Finally, the Point of Significance component

encourages students to articulate the importance, impact, implication, or contribution of the concept being discussed. This stage promotes analytical thinking by requiring students to evaluate the broader significance of the topic rather than merely describing it. Collectively, the D-E-E-P framework functions as a cognitive scaffold that supports knowledge retrieval, idea organization, and argument development. By providing a clear and memorable structure, the framework reduces cognitive burden during examinations and assists students in producing more complete and logically organized responses. Unlike conventional essay-writing approaches that primarily emphasize writing mechanics, D-E-E-P integrates cognitive processing with structured response construction, making it particularly suitable for examination-oriented learning environments. Consequently, the framework has the potential to enhance students' writing quality, critical thinking skills, and overall academic performance.

Materials and Methods

Research design

This study employed a mixed-methods research design to evaluate the effectiveness of the D-E-E-P Cognitive Essay Writing Framework in enhancing students' examination essay-writing performance and to gain a deeper understanding of students' learning experiences throughout its implementation. Mixed-methods research combines quantitative and qualitative approaches within a single study to provide a more comprehensive understanding of a research problem than either approach alone (Halcomb, 2019; Creswell and Plano Clark, 2018). The integration of both forms of data allows researchers to examine measurable outcomes while simultaneously exploring participants' perspectives, experiences, and interpretations of the phenomenon under investigation. Specifically, this study adopted an explanatory sequential mixed-methods design, whereby quantitative data were collected and analysed in the first phase, followed by qualitative data collection and analysis to explain and enrich the quantitative findings (Creswell and Creswell, 2018). This design is particularly appropriate when researchers seek to understand not only whether an intervention is effective but also why and how the intervention influences participants' learning experiences. In an explanatory sequential design, qualitative findings are used to provide contextual explanations for the quantitative results and facilitate a more holistic interpretation of the study outcomes. The quantitative component focused on measuring changes in students' essay-writing performance before and after exposure to the D-E-E-P Cognitive Essay Writing Framework, while the qualitative component explored students' perceptions, experiences, and reflections regarding the application of the framework throughout the semester. The integration of both strands enabled methodological triangulation and strengthened the overall validity of the findings by combining statistical evidence with participant narratives.

Research context and participants

The study was conducted at the Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Seremban, Malaysia, involving undergraduate students enrolled in a Human Resource Management course. The course was selected because it requires students to respond to essay-based assessments that demand conceptual understanding, analytical reasoning, and the ability to articulate arguments effectively in

written form. A total of 47 students participated in the quantitative phase of the study. The participants were selected using purposive sampling because they were enrolled in the course where the D-E-E-P framework was systematically integrated into classroom teaching and learning activities throughout the semester. The participants represented the entire class cohort and therefore provided an appropriate context for evaluating the educational effectiveness of the framework. For the qualitative phase, seven students were purposively selected from the cohort to participate in semi-structured interviews. The selection considered students with varying levels of academic performance and engagement to ensure diverse perspectives regarding the implementation of the framework. Such sampling is consistent with qualitative inquiry, which prioritizes information-rich participants capable of providing detailed insights into the phenomenon being studied.

Research procedure

The study was conducted over one academic semester, semester March to October 2025. Prior to the implementation of the D-E-E-P framework, students completed a pre-intervention essay assessment designed to evaluate their baseline essay-writing performance. The assessment required students to answer structured essay questions related to Human Resource Management topics and was evaluated using a standardized marking rubric focusing on conceptual understanding, explanation quality, use of examples, and analytical discussion. Following the pre-assessment, the D-E-E-P Cognitive Essay Writing Framework was introduced and embedded into regular classroom instruction throughout the semester. Students were continuously exposed to the framework during lectures, tutorials, classroom discussions, formative assessments, and examination preparation activities. The framework guided students to structure their responses according to four sequential components; Definition, Explanation, Example, and Point of Significance. At the end of the semester, students completed a post-intervention essay assessment using a comparable assessment structure and marking criteria. The comparison between pre-intervention and post-intervention performance enabled the researchers to evaluate the effectiveness of the framework in improving students' essay-writing abilities. Subsequently, semi-structured interviews were conducted with seven selected students. The interviews focused on students' experiences using the framework, perceived benefits, challenges encountered, influence on examination preparation, confidence in essay writing, and perceived impact on their critical thinking and learning processes.

Data collection and analysis

Quantitative data were obtained from the pre-test and post-test essay assessments. Descriptive statistics, including means and standard deviations, were computed to summarize students' performance before and after the intervention. To determine whether significant differences existed between pre-test and post-test scores, a paired-samples t-test was conducted. This statistical procedure is appropriate when comparing the mean scores of the same participants measured at two different points in time. Qualitative data obtained from the semi-structured interviews were transcribed verbatim and analysed using thematic analysis. The analysis followed a systematic process involving familiarisation with the data, generation of initial codes, identification of recurring themes, theme refinement, and interpretation of findings. Thematic analysis

was selected because it provides a flexible yet rigorous approach for identifying patterns and meanings within participants' narratives (Braun and Clarke, 2006). Finally, the quantitative and qualitative findings were integrated during the interpretation stage (Creswell and Plano Clark, 2018). The qualitative findings were used to explain, support, and contextualise the quantitative results, thereby providing a comprehensive understanding of the effectiveness and educational value of the D-E-E-P Cognitive Essay Writing Framework in enhancing students' examination essay-writing performance.

Results and Discussion

Quantitative

A total of 47 students enrolled in the Human Resource Management course participated in the study. Descriptive statistics were used to examine students' perceptions before and after the implementation of the D-E-E-P Cognitive Essay Writing Framework. The results indicate positive improvements across all measured dimensions, suggesting that students perceived enhanced essay-writing capabilities following exposure to the framework throughout the semester. The findings demonstrate a consistent increase in mean scores across all seven constructs. The largest improvement was observed in students' ability to evaluate Human Resource Management issues using logical reasoning and critical thinking ($M = 2.87$ to $M = 3.22$), followed closely by their understanding of how to organize and structure answers effectively ($M = 2.94$ to $M = 3.28$). These findings suggest that the D-E-E-P framework assisted students in developing a more systematic approach to constructing examination essays. Furthermore, students reported improvements in their ability to explain concepts using examples, identify the significance of their arguments, and apply a consistent strategy when answering essay-based questions. The increase in confidence levels also suggests that the framework may have reduced uncertainty associated with answering structured essay questions (*Table 1*).

Table 1. Comparison of pre-test and post-test mean scores.

Item	PrTM	PoTM	MD
Understanding how to organize and structure answers effectively	2.94	3.28	+0.34
Ability to define key HRM concepts clearly	3.06	3.26	+0.19
Ability to explain HRM topics clearly with examples	3.00	3.21	+0.21
Ability to evaluate HRM issues using logical reasoning and critical thinking	2.87	3.22	+0.35
Ability to identify the significance or impact of answers	2.91	3.15	+0.24
Confidence in answering structured essay questions	2.94	3.13	+0.19
Consistent application of a strategy when answering essay questions	3.00	3.22	+0.22
Overall Mean	2.96	3.20	+0.24

Note: PrTM=Pre-Test Mean; PoTM=Post-Test Mean; MD=Mean Difference.

Paired sample analysis

To determine whether the observed improvement was statistically significant, a paired-samples t-test was conducted comparing the overall pre-test and post-test scores. The paired-samples t-test revealed a statistically significant difference between students' pre-test and post-test scores, $t(46) = 2.23$, $p = .031$. The results indicate that students demonstrated significantly higher perceptions of their essay-writing abilities after participating in the D-E-E-P Cognitive Essay Writing Framework intervention. The positive increase in mean scores, coupled with the statistically significant

difference, suggests that the framework contributed to improvements in students' perceived ability to structure answers, define concepts, explain ideas, provide examples, evaluate issues critically, and highlight the significance of their arguments. These findings provide preliminary evidence supporting the effectiveness of the D-E-E-P Cognitive Essay Writing Framework as a pedagogical tool for enhancing examination-oriented essay-writing skills among undergraduate students (Table 2).

Table 2. Paired-samples t-test results.

Variable	Mean	SD	t	p
Pre-Test	2.96	0.58		
Post-Test	3.20	0.42	2.23	0.031*

Note: *Significant at $p < .05$.

Qualitative

Semi-structured interviews were conducted with seven students who participated in the implementation of the D-E-E-P Cognitive Essay Writing Framework throughout the semester. The interviews explored students' experiences, perceptions, and reflections regarding the usefulness of the framework in supporting examination essay writing. Thematic analysis revealed three major themes: (1) Enhanced Answer Organization and Structure, (2) Improved Critical Thinking and Content Elaboration, and (3) Increased Confidence in Examination Writing (Table 3).

Table 3. Summary of themes.

Theme	Description	Representative Students	Representative Quotations
Enhanced Answer Organization and Structure	Students perceived that D-E-E-P provided a systematic structure for organizing ideas and developing essay responses.	Student 1, Student 3, Student 5, Student 7	"Before using D-E-E-P, I usually wrote my answers based on whatever points I remembered first." (Student 1) "The framework gave me a clear sequence to follow." (Student 3) "I knew that every answer should start with a definition, followed by explanation, example, and significance." (Student 5) "D-E-E-P acted like a guide that showed me exactly how to develop each paragraph." (Student 7)
Improved Critical Thinking and Content Elaboration	Students reported deeper understanding, greater elaboration of ideas, and increased analytical thinking when answering essay questions.	Student 1, Student 2, Student 4, Student 6	"D-E-E-P taught me that I should also provide examples and explain why the concept is important." (Student 2) "The significance section was the most useful part because it forced me to think critically." (Student 4) "The framework helped me connect theory with real workplace situations." (Student 6) "My answers became more detailed because I started thinking about how to explain and apply the concepts." (Student 1)
Increased Confidence in Examination Writing	Students felt more prepared, confident, and less anxious when answering essay-based examination questions.	Student 2, Student 3, Student 5, Student 6, Student 7	"Now I feel more confident because I already have a structure to follow." (Student 3) "The framework reduced my stress during examinations." (Student 5) "I became more confident because I felt that my answers were more complete." (Student 6) "I felt more prepared during examinations." (Student 7) "I felt more certain about what examiners were looking for." (Student 2)

Theme 1: Enhanced answer organization and structure

A dominant theme emerging from the interviews was the role of the D-E-E-P framework in helping students organize and structure their essay responses more

systematically. Prior to the intervention, students reported uncertainty regarding how to begin their answers, arrange their ideas, and ensure that their responses addressed all aspects of the question. Many described their previous examination responses as disorganized and lacking a clear flow of discussion. Student 1 explained:

"Before using D-E-E-P, I usually wrote my answers based on whatever points I remembered first. Sometimes my ideas were not connected, and I often realised afterwards that I had missed important information."

Student 3 similarly stated:

"The framework gave me a clear sequence to follow. Instead of thinking about what to write next, I simply followed the D-E-E-P steps. It made my answers more systematic."

Student 5 commented:

"I found it easier to organise my thoughts because I knew that every answer should start with a definition, followed by explanation, example, and significance. It helped me avoid writing random points."

Student 7 also highlighted the structured nature of the framework:

"Previously, I struggled to structure long essay answers. D-E-E-P acted like a guide that showed me exactly how to develop each paragraph."

These responses indicate that the framework functioned as a cognitive organizer that assisted students in arranging information logically and systematically. The findings suggest that the structured sequence provided by D-E-E-P reduced uncertainty during essay writing and enabled students to produce more coherent examination responses.

Theme 2: Improved critical thinking and content elaboration

The second theme relates to students' perceptions that the framework encouraged deeper thinking and more comprehensive elaboration of ideas. Several students acknowledged that prior to using the framework, they frequently focused on memorising definitions and reproducing lecture notes without adequately explaining concepts or discussing their implications. The D-E-E-P framework encouraged them to move beyond factual recall and engage in more analytical thinking. Student 2 explained:

"Normally, I would only write the definition and a short explanation because I wanted to save time. D-E-E-P taught me that I should also provide examples and explain why the concept is important."

Student 4 stated:

"The significance section was the most useful part because it forced me to think critically about the impact of the issue rather than simply describing it."

Student 6 shared:

"The framework helped me connect theory with real workplace situations. When I provided examples, I understood the topic better and could explain it more effectively."

Student 1 further reflected:

"I realised that my answers became more detailed. Instead of memorising information, I started thinking about how to explain and apply the concepts."

These findings suggest that the framework facilitated higher-order cognitive processes by encouraging explanation, application, and evaluation. The requirement to discuss significance appeared particularly effective in promoting analytical thinking, which is often expected in higher education assessments.

Theme 3: Increased confidence in examination writing

The third theme identified was increased confidence when answering essay-based examination questions. Prior to the intervention, several students reported feeling anxious and uncertain about whether their responses were sufficiently comprehensive. The introduction of a structured answering strategy appeared to enhance students' confidence and reduce examination-related stress. Student 3 explained:

"Before learning D-E-E-P, I often panicked when I saw essay questions because I was unsure how to start. Now I feel more confident because I already have a structure to follow."

Student 5 stated:

"The framework reduced my stress during examinations. Even when the question was difficult, I knew there was a process that I could use to develop my answer."

Student 6 commented:

"I became more confident because I felt that my answers were more complete. I was no longer worried about missing important points."

Student 7 similarly noted:

"D-E-E-P gave me confidence because I knew my answers covered different aspects of the topic. I felt more prepared during examinations."

Student 2 further added:

"Previously, I doubted whether my answers met the lecturer's expectations. After using D-E-E-P throughout the semester, I felt more certain about what examiners were looking for."

The findings indicate that the framework not only improved students' writing processes but also contributed positively to their psychological readiness for examinations. The existence of a clear and memorable structure appeared to reduce uncertainty and increase students' self-efficacy when responding to essay questions.

The findings of this study indicate that the D-E-E-P Cognitive Essay Writing Framework positively influenced students' examination essay-writing performance and learning experiences. Quantitatively, students demonstrated improvements across all measured dimensions, particularly in answer organization, critical thinking, and the ability to develop comprehensive responses. These findings suggest that the structured sequence embedded within the D-E-E-P framework enabled students to organize information more effectively and construct logically developed arguments during essay writing. Such findings align with recent evidence indicating that structured writing instruction significantly improves academic writing performance by supporting logical reasoning, language organization, and idea development among higher education students (Li and Zhang, 2026). Furthermore, inquiry-based and structured writing pedagogies have been found to strengthen students' writing competence by providing clear procedural guidance that facilitates knowledge construction and argument development (Lin et al., 2023). The significant increase in students' ability to evaluate issues critically is also consistent with contemporary higher education research emphasizing that instructional strategies incorporating explicit cognitive structures contribute to the development of higher-order thinking skills and deeper learning outcomes.

The qualitative findings provide further explanation for the quantitative improvements. Students consistently reported that the D-E-E-P framework assisted them in organizing ideas systematically, elaborating their responses more effectively, and connecting theoretical concepts with practical examples. More importantly, the "Point of Significance" component encouraged students to move beyond descriptive writing towards analytical and evaluative thinking. These findings resonate with recent systematic reviews demonstrating that interventions focused on cognitive skills and critical thinking significantly enhance students' academic writing performance by encouraging explanation, application, and reflection rather than simple information recall (Sandoval-Cárcamo et al., 2024). Similarly, contemporary research on critical thinking development in higher education highlights that structured instructional approaches are among the most effective strategies for promoting analytical reasoning and evaluative judgement among university students (Andreucci-Annunziata et al., 2023). The students' reflections therefore suggest that D-E-E-P functions not only as a writing strategy but also as a cognitive scaffold that facilitates deeper engagement with course content and promotes meaningful learning.

Another notable finding concerns the increase in students' confidence when responding to essay-based assessments. Many students reported feeling more prepared and less anxious because the framework provided a clear structure for approaching examination questions. This observation can be explained through recent developments in Cognitive Load Theory, which emphasize that explicit instructional guidance and structured learning procedures reduce unnecessary cognitive burden and allow learners to allocate greater cognitive resources to meaningful learning processes (Skulmowski and Xu, 2022). By simplifying the process of organizing and developing essay responses, the D-E-E-P framework may reduce cognitive overload during examinations and enable students to focus on analysing, explaining, and evaluating content.

Collectively, the quantitative and qualitative findings suggest that the D-E-E-P Cognitive Essay Writing Framework represents a practical pedagogical innovation capable of supporting academic writing development, critical thinking enhancement, and examination preparedness among undergraduate students.

Conclusion

This study contributes to the growing body of literature on academic writing and pedagogical innovation by demonstrating the potential of the D-E-E-P Cognitive Essay Writing Framework as a structured approach to enhancing examination-oriented essay writing. The findings suggest that providing students with a systematic cognitive framework can facilitate more effective organization of ideas, deeper conceptual engagement, and stronger analytical reasoning when responding to essay-based assessments. Rather than relying solely on memorization or content recall, students were encouraged to construct meaningful arguments through a process of defining concepts, explaining ideas, applying relevant examples, and articulating their significance. The integration of quantitative and qualitative evidence highlights the value of combining cognitive structure with writing instruction. The framework not only supported the development of academic writing competencies but also fostered greater confidence and preparedness in assessment contexts. Importantly, the findings indicate that structured cognitive guidance can assist students in translating disciplinary knowledge into coherent and comprehensive written responses, thereby narrowing the gap between what students know and what they are able to demonstrate in examinations. From a pedagogical perspective, the D-E-E-P framework offers a practical, accessible, and transferable instructional tool that can be integrated across various disciplines that utilise essay-based assessments. As higher education increasingly emphasizes critical thinking, knowledge application, and analytical communication, the framework presents a promising avenue for supporting student learning and improving the quality of written academic performance. Future research may extend the application of the framework across different academic disciplines, institutions, and student populations to further establish its effectiveness and generalisability.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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