

Developing a Conceptual Framework for Rhetorical Structures in Arab Postgraduate Computer Engineering Theses

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ABSTRACT

The literature review occupies a strategic rhetorical position in a doctoral thesis. It enables researchers to situate their studies within established scholarship, recognize underexplored areas, and establish the rationale for their contributions. For Arab postgraduate researchers working in technical areas such as Computer Engineering, however, developing literature reviews that progress from summary to sustained critical discussion can be challenging. This paper therefore develops a conceptual framework for examining rhetorical organization in Arab doctoral theses by bringing together genre-based move analysis, research on reporting verbs, disciplinary expectations, and cultural influences. The framework treats structural, lexical, and contextual factors as interconnected dimensions of literature review construction. It indicates that Arab postgraduate writers may be relatively successful in establishing a research territory while experiencing greater difficulty when identifying gaps and claiming a research niche, particularly when their use of evaluative reporting verbs is limited. Framing these issues within academic writing research, the study offers a basis for supervisory practice and for subsequent empirical investigation, while also providing a broader perspective on rhetorical effectiveness in technical doctoral writing.

Keywords: Academic writing, literature review, rhetorical structures, reporting verbs, Arab postgraduates, Computer Engineering.

INTRODUCTION

The chapter dedicated to the literature review is generally acknowledged as an essential part of doctoral thesis. It situates the research within existing knowledge and demonstrates the ability of the writers to engage critically with prior work (Boote & Beile, 2005; Feak & Swales, 2009). In Computer fields, where knowledge develops quickly and interdisciplinary is common, the literature review is especially important for synthesizing diverse sources and determining the relevance of new contributions (Kitchenham & Charters, 2007; Carrera-Rivera et al., 2022). As Argued by Swales (1990-2004), in his seminal Creating a Research Space (CARS) model, the literature review is a rhetorical site where scholars establish territory, identify gaps, and occupy niches. Later, in

(2006) Kwan extended this model specifically for doctoral theses. She proposed a genre-based move analysis that highlights the schematic structures underpinning literature review chapters. Her work demonstrated that doctoral writers often emphasize moves such as establishing territory and reviewing previous studies, while struggling with the more critical task of gap identification and niche occupation. For example, Soler-Monreal (2015), Bastola & Ho (2023) research on STEM and Computer Science PhD found that writers establish the research territory (move 1) in the literature review by mapping the main sub areas and approaches such as distributed systems, machine learning, and embedded system, and summarizing crucial approaches as established prior knowledge, without assessing or challenging them.

In regard to move 2; indicating a gap in previous studies, this move signals problems, or absences in the reviewed literature, which indicates the necessity of the current study. For instance, in the field of Computer Science, a thesis writer starts building a gap before introducing their own research by pointing out that existing studies have left certain issues unresolved. An example of such a statement is: “although existing studies have proposed numerous heuristics, few have addressed energy aware scheduling under strict latency constraints in resource constrained IoT devices” (Bastola & Ho, 2023).

Concerning the third move, Occupying the Niche, which is frequently found in the concluding part of the literature review, the writer clearly positions the thesis as a solution to the gap that has been identified. This may take the form of statement such as; to address this limitation, the present study develops a ... or, to bridge this gap the current study proposed Soler-Monreal (2015) focuses mainly on Move 3 in literature review of Computer Science PhD theses. She distinguishes between the native and non-native writers in realizing Move 3. She claims that natives are more strongly realize, using evaluative and promotional language to position their research contribution. Non- native writers, on the other hand, tend to be more cautious, sometimes omitting explicit promotional Move 3 realization.

Arab postgraduate students often struggle while writing the literature reviews (Rabie & Boraie, 2021). Studies show that Saudi and Arab graduate students face problems with discourse organization, argumentation and genre conventions. These difficulties are linked to limited exposure to English academic writing and cultural habits of cautious critique. As a result, many rely too much on descriptive summaries. They use little evaluative language. Their authorial voice is weak (Jomaa, Al Mashani, & Al Mahri, 2025; Al Mahmud & Rahman, 2023). The problem is sharper in technical fields like Computer Engineering. In these areas, clarity and precision are vital to place research within fast-moving disciplines.

Reporting verbs constitute another important component of literature review rhetoric because they signal how writers position themselves toward previous research. Hyland (2002) groups reporting verbs into three broad categories: research acts, cognition acts, and discourse acts. This classification draws attention to the role of lexical selection in establishing credibility, conforming to disciplinary expectations, and expressing authorial identity. Non-native academic writers, however, may rely on a relatively narrow repertoire, including verbs such as “say,” “state,” and “report,” while using evaluative choices such as “argue,” “criticize,” and “employ” less frequently (Pickard, 1993; Mansourizadeh & Ahmad, 2011). A restricted reporting-verb repertoire can therefore reduce the writer’s ability to evaluate earlier scholarship and construct a convincing research space.

Against this background, the paper develops a conceptual framework for examining rhetorical structure in the literature reviews of Arab postgraduate Computer Engineering theses. The framework considers the combined influence of rhetorical moves, reporting verbs, and contextual conditions, drawing on genre theory (Swales, 1990–2004; Kwan, 2006), research on disciplinary discourse, and cultural perspectives on academic writing. The framework is guided by the following conceptual questions:

1. What rhetorical structure are central to Computer Engineering theses?
2. How do culture and disciplinary factors shape these structures?
3. How can a frame work guide theses writers and doctoral supervision?
4. How does the use and variety of reporting verbs influence Arab postgraduate students' ability to construct authorial voice and demonstrate critical engagement in Computer Engineering literature review?

This conceptual contribution is intended to support both researchers in enhancing academic writing, providing supervisors with diagnostic tools, and laying the groundwork for future empirical studies that validate the framework across disciplines and cultural contexts.

THEORETICAL BACKGROUND

Academic writing is a unique form of scholarly communication that allows researchers to share their findings and contribute new insights to their fields. This type of writing follows established conventions and standards that ensure clarity, credibility, and impacts. Adhering to these norms, authors can strengthen the quality of their work and gain recognition within the academic community through publication (Wang et., al, 2023). Genre analysis is the theoretical foundation for understanding how language functions within specific context. It provides a framework for classifying the linguistic characteristics and communicative strategies employed across several genres that are commonly encountered in academic discourse (Manzoor et., al, 2020). This approach has been applied to examine the rhetorical patterns and organizational structures that shape the common genres in academic discourse (Casal & Kessler, 2024).

Academic discourse can be studied from three complimentary approaches; contextual, textual, and critical shown in figure (1). Each of which emphasizing how knowledge is generated and disseminated within scholarly societies (Jomaa, 2019).

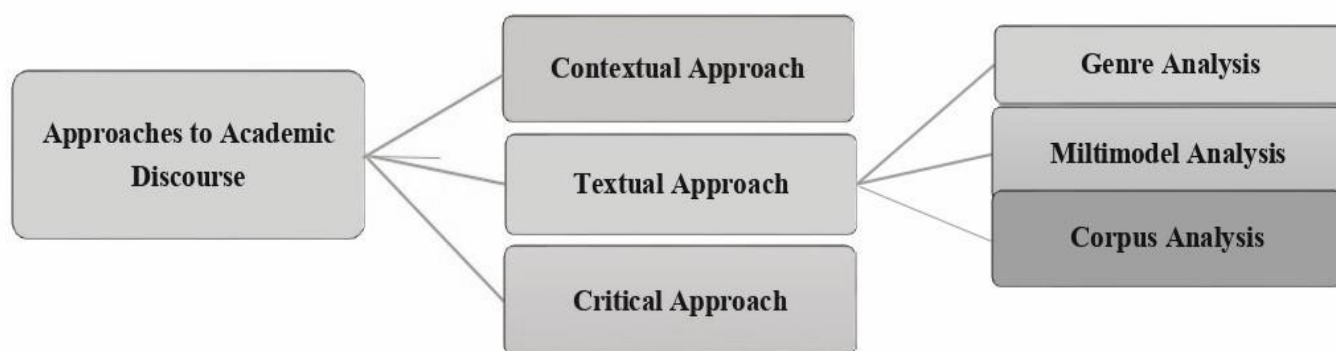


Figure (1): Synthesis of Approaches to Academic Discourse

Figure (1) maps three specialized analytical methods emerged from the textual perspective: Genre Analysis, concerned with the conventions and communicative purposes of academic genres; Multimodal Analysis, which examines the interplay of textual, visual, and auditory elements; and Corpus Analysis, which employs large-scale textual datasets to uncover linguistic patterns. Textual approaches to academic discourse are deeply enriches by genre analysis, providing a lens through which to analyze how texts work across different social and disciplinary contexts (Jomaa, 2019).

According to Hyon (1996), within the field of applied linguistics, genre analysis has received a considerable attention. Consequently, three prominent approaches for analyzing genre have emerged as illustrated in figure (2): English for Specific Purposes (ESP), Sydney School of Systemic Functional Linguistic (SFL), and North American Rhetoric Studies (NR). These approaches have shaped current academic writing study, providing unique theoretical and methodological insights (Lin,2020).

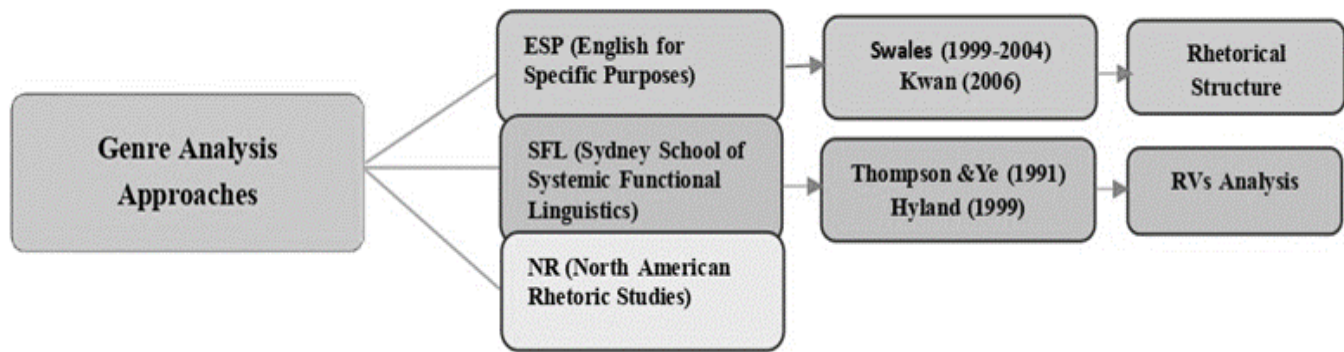


Figure 2: Synthesis of Approaches to Genre Analysis

Approaches that address academic writing from a textual perspective focus on linguistic and rhetorical features, drawing on models such as Swales' genre-based model (1990) and Bhatia's expanded theory (1993). These studies often rely on discourse and corpus analysis to uncover lexical-grammatical choices, structural patterns and rhetorical moves, while systemic functional linguistics offers insights into language as a resource for meaning-making (Fairclough, 1992; Hita & Matthiessen, 2024). For example, Kwan (2006) demonstrated how literature reviews in doctoral dissertations are employed to establish a research foundation, identify knowledge gaps, and highlight contributions, thus illustrating the central role of textual analysis in understanding academic genres.

In this context, as genre theory has become a fundamental perspective for the study and analysis of academic discourse, this research adopts genre analysis as its primary theoretical framework, emphasizing the influence of social and academic contexts on the function and formation of texts.

Swales' Cars Model And Kwan's Framework

Generally, genre theory offers the groundwork for understanding how academic texts are structured to achieve communicative purposes. One of the most influential frameworks for analyzing academic texts, introductions and literature reviews in particular, is Swales' Creating a Research Space (CARS) model (1990-2004), it almost remains the first reference for all following models in the same field. In his model, Swales identifies three main rhetorical moves: Establishing a territory, identifying a gap and occupying the niche. These three moves mainly focus on the way the writers situate their work within the existing scholarship and justify their contributions. In 2006, based on Swales' CARS model, Kwan proposed a comprehensive framework for literature review chapters and applied the move analysis to doctorate theses. In her study, Kwan concludes that the literature review chapter should not be regarded as a mere descriptive summary of prior studies. Instead, it functions as rhetorically organized discourse that both demonstrates the writers command of disciplinary knowledge and simultaneously construct the writer's scholarly identify within the academic community (Kwan, 2006).

Academic Writing Discourse: Rhetorical Strategies, Citation Practices, And Authorial Voice

Academic writing is defined by rhetorical strategies that balance description, critique, and synthesis. Citation practices, as essential part of academic discourse practices, is not neutral they shape academic discourse. It allows writers to build their arguments while simultaneously showing where they stand in the intellectual landscape, showing that the writer's argument is a part of an ongoing debate, not isolated (Hyland, 1999). The lexical dimension can be effectively illustrated by using reporting verbs. Hyland (2002) and Charles (2006) show that reporting verbs are rhetorical choices, not just grammatical ones. The writer's choice of reporting verbs is crucial for expressing their voice, it shows whether they are aligning with, distancing from, or challenging the cited author. They contend that evaluative verbs strengthen authorial voice, while descriptive verbs transmit information without the author's clear stance. Mansourizadeh and Ahmed (2011), found that novice and non-native scientific writers often find it difficult to apply citation and stance-marking strategies effectively. This often resulted in an overuse of descriptive verbs such as reported or stated while rarely using evaluative verbs

such as criticized or argued, thereby weakening their critical engagement. Pickard (1993) revealed that the use of evaluative verbs in scientific writing can either support or contradict previous research. The following table illustrates this contrast:

Table1.
Contrasting Descriptive vs. Evaluative Verb

Type of Reporting Verbs	Example	Function
Descriptive	reported, stated, described, found, identified, observed...	Neutral transmission of information
Evaluative	argued, challenged, demonstrated, criticized, highlighted, contended...	Expresses stance, highlights contribution

As a result of the language barriers and familiarity lacking with disciplinary conventions, writers produce information rather than analyze it. In other words, they often tend to describe the prior studies not evaluating them critically. These challenges, for Arab postgraduates, are compounded by linguistic transfer and limited exposure to genre conventions in English academic discourse (Jomaa & Bidin, 2019).

Disciplinary Specificity: Computer Engineering As A Technical Field

Different disciplinaries mean different conventions and rhetorical structure is strongly affected by the disciplinary conventions. According to Becher and Trowler (2001), disciplines are “academic tribes,” each of which has its own standards and modes of investigations. As a constantly developing technical field, computer engineering, like other computer fields such as computer science and software engineering, require literature assessments that emphasize technological trends, synthesize many sources, and place contributions within quickly changing research settings. Writing literature reviews in such technical field is difficult due to the exponential growth of the publication in this field. As a result, a systematic approach to manage the information overloaded is a need (Kitchenham & Charters, 2007; Carrera-Rivera et al., 2022). In computer engineering theses, literature reviews must go beyond summarizing prior work to critically evaluate and integrate findings across subfields.

Cultural Context: Arab Postgraduates’ Linguistic And Cultural Influences

Academic writing practices are strongly influenced by the writers' cultural and linguistic backgrounds. Academics conducting research in another language, not their first language, often encounter difficulties in effectively conveying their points rhetorically (Ab Rahim et al., 2014). Arab postgraduates, as non-natives, often struggle in adopting critical and evaluative stances since educational systems prioritize knowledge reproduction over critique (Rabie & Boraie, 2021). Non-native writers, according to Amnuai (2019), may avoid using strong evaluative language, resulting in cautious citation practices and minimal authorial presence. In the similar vein Nguyen (2014) argued that non-natives doctorate students’ writing challenges are exacerbated by previous language experiences and imprecise supervisory expectations. It can be said that these cultural effects intersect with disciplinary demands, leading Arab postgraduates to prioritize creating territory while underutilize gap identification and niche occupation.

Conceptual Development

Developing a conceptual framework for rhetorical structure in Arab postgraduate Computer Engineering requires integrating insights from genre theory, academic discourse, disciplinary conventions, and cultural contexts. Each strand adds a unique perspective, but when combined, they form a comprehensive model for understanding how literature reviews are created and where issues arise.

Integrating Genre Theory And Academic Discourse

Swales (1990-2004) model and Kwan's (2006) move analysis framework emphasize the rhetorical progression from establishing territory to identifying gaps and occupying niches. These two frameworks provide the essential structural foundation for analyzing literature reviews. However, according to Bestola & Ho, 2023, non-native writers often struggle with identifying gaps and occupying niches, producing literature reviews that are descriptive rather than critical. Hyland's (2002) work on reporting verbs completing this structural lens by demonstrating how lexical choices reflect the writers' stance and evaluation. Together, move analysis and reporting verb frameworks reveal how structure and language interact to construct authorial voice and scholarly positioning.

Disciplinary Specificity In Computer Engineering

Computer Engineering, as a distinct academic discipline, imposes rhetorical demands that differ markedly from those in the humanities or social sciences. Like other computer fields, computer engineering is characterized by rapid growth in data which means literature reviews in this domain must do more than simply summarize prior work; they must synthesize diverse sources with maintaining precision and clarity (Carrera-Rivera et al., 2022). Unlike other disciplines, where interpretive stance, Computer Engineering demands explicit alignment with empirical evidence and methodological rigor. This result in a dual challenge that Arab postgraduate writers faced; they must navigate general academic conventions and meet the expectations of a highly technical community of practice.

Cultural And Linguistic Influences

Cultural background plays a critical role in shaping rhetorical structure and academic writing practices. Arab postgraduates, often demonstrate caution practices, a tendency toward limited critique, and reliance on descriptive reporting verbs rather than evaluative ones. This attitude stems from educational traditions that prioritize the transmission over critical engagement (Rabie & Boraie 2021; Amnuai, 2019). Research by Jomaa and Bidin (2019) found that Arab students tend to underuse evaluative language, which weakens their ability to establish research gaps and niches. The intersection of these cultural tendencies with disciplinary demands creates distinctive rhetorical patterns in computer Engineering theses.

Towards A Synthesized Framework

To build a synthesized framework, the three strands discussed before; the Structural Dimension (Moves), the Lexical Dimension (Reporting Verbs) and the Contextual Dimension (Culture and Discipline). Literature reviews are organized around rhetorical moves; territory, gap and niche. Reporting verbs function as linguistic markers that reinforce or weaken these moves. While cultural traditions and disciplinary norms shape how moves and verbs are deployed. The interaction of these dimensions determines the effectiveness of literature review writing in Arab postgraduate Computer Engineering theses. In addition to explaining observed challenges, this framework, will also provide a tool for supervisors to diagnose weakness and guide students toward more rhetorically effective writing.

Proposed Conceptual Framework

The proposed framework, integrates three interrelated dimensions; structural, lexical and contextual to explain how Arab postgraduate Computer engineering PhD writers construct their literature reviews. Each dimension contributes to the overall rhetorical effectiveness of the text, and their interaction determines the clarity, coherence, and authorial presence of the literature review.

Structural Dimension: Genre-Based Moves

Building on Swales' (1990-2004) CARS model and Kwan's (2006) move analysis framework, the structural dimension highlights the rhetorical flow of literature reviews. Writers are expected to establish the research territory, identify gaps in existing research, and occupy the niche by presenting their own contribution. In practice, however, non-native writers often manage to establish the territory but encounter difficulties in identifying gaps and claiming the niche, which results in literature reviews that lean toward description rather

than critique (Bastola & Ho, 2023). This issue is particularly evident among Arab postgraduate writers, who, as non-native English speaker, consistently encounter challenges in academic writing. Their literature reviews tend to rely on descriptive summaries rather than critical analysis, reflecting limited use of evaluative language and constrained authorial voice (Jomaa, Al Mashani, & Al Mahri, 2025; Jomaa and Bidin, 2019)

Lexical Dimension: Reporting Verbs And Citation Practices

Hyland's (2002) classification of reporting verbs, which categories verbs into main three categories; research, cognition, and discourse, provides a lens for analyzing hoe lexical choices reinforce or weaken rhetorical moves. Reporting verbs not only attribute ideas but also signal stance and evaluation, shaping the writer's authorial voice (Charles, 2006). However, Arab postgraduates frequently rely on a narrow range of verbs (e.g., state, say) and underutilize evaluative verbs, which limits their ability to critically engage with prior work (Mansourizadeh & Ahmad, 2011).

Contextual Dimension: Cultural And Disciplinary Influences

Cultural traditions and disciplinary norms intersect to shape rhetorical structure. Arab educational contexts often emphasize reproduction of knowledge over critique, leading to cautious practices and limited authorial presence (Rabie & Boraie, 2021; Amnuai, 2019). In computer fields, disciplinary expectations of precision and empirical rigor further complicate literature review writing, as students must synthesize rapidly expanding bodies of technical research (Kitchenham & Charters, 2007; Carrera-Rivera et al., 2022).

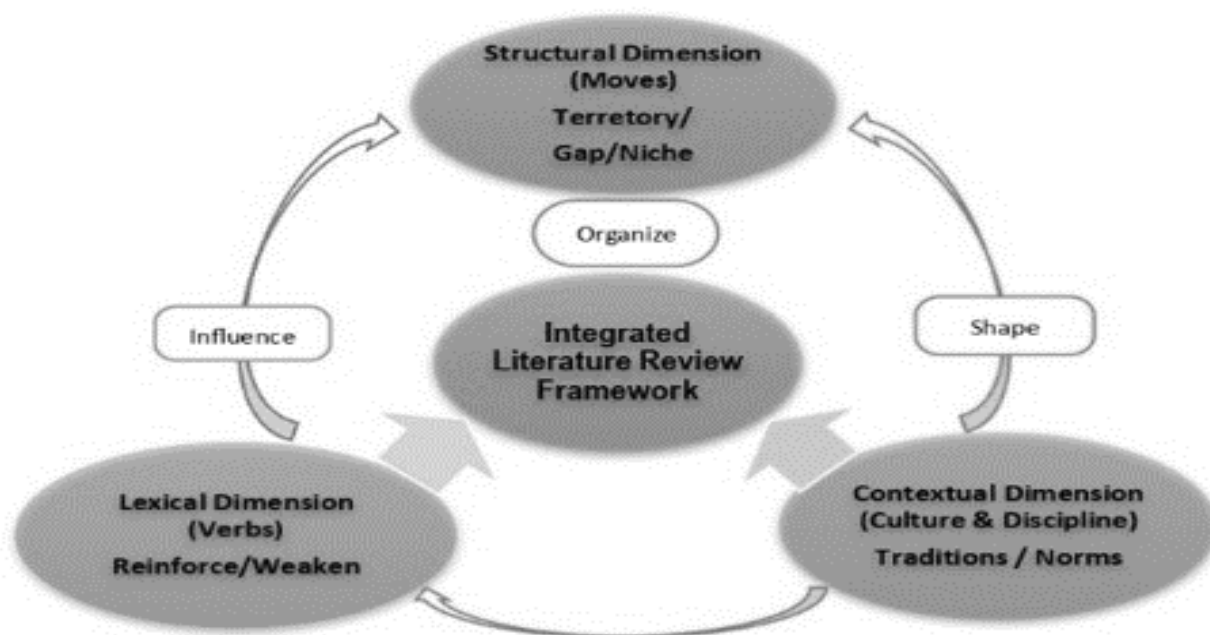


Figure (3) The Integrated Literature Review Framework

The framework conceptualizes literature review writing as the intersection of these three dimensions figure (3). Structural moves provide the rhetorical skeleton, reporting verbs supply the linguistic realization, and cultural and disciplinary influence shape the choices made within both. When these dimensions align effectively, the literature review demonstrates coherence, critical engagement, and authorial voice. When misaligned, the result is text that is descriptive, fragment, or lacking in rhetorical force.

Implications

The proposed conceptual framework has implications for supervision, and research in academic writing. It highlights how genre-based instruction and explicit focus on rhetorical moves and reporting verbs can help Arab postgraduate Computer Engineering students build stronger voices and produce more coherent literature reviews.

For supervision, the framework provides a diagnostic tool that helps supervisors identify specific weaknesses in students' literature reviews, such as imbalance in rhetorical moves or limited use of evaluative verbs. This makes feedback more targeted and transparent, especially for non-native English writers. For research, the framework opens opportunities for corpus-based validation, cross-cultural comparisons, and longitudinal studies of doctoral writing development.

This study enhances understanding of rhetorical practices and offers strategies to improve academic writing across disciplines and cultures. The conceptual framework provides a practical and theoretical foundation for improving literature review writing among Arab postgraduate Computer Engineering students.

CONCLUSION

This paper has proposed a conceptual framework for understanding rhetorical structures in Arab postgraduate Computer Engineering PhD theses. By integrating genre theory (Swales, 1999, 2004; Kwan, 2006), academic discourse studies (Hyland, 2002; Charls, 2006), disciplinary specificity (Kitchenham & Charters, 2007; Carrera-Rivera et al., 2022), and cultural context (Rabie & Boraie, 2021; Amuai, 2019; Jomaa & Bidin, 2019), the framework highlights how structural moves, reporting verbs, and contextual influences interact to shape literature review writing. This multidimensional approach underscores that literature reviews are not merely descriptive summaries but complex rhetorical acts requiring critical engagement, linguistic precision, and disciplinary awareness.

The originality of this framework lies in its synthesis of structural, lexical, and contextual dimensions. It offers a holistic lens for diagnosing and addressing the challenges faced by Arab doctoral writers in technical fields. It supports doctoral supervision by equipping supervisors with diagnostic tools to identify rhetorical weaknesses. Furthermore, this framework lays the groundwork for future empirical research, including corpus-based validation and cross-disciplinary comparisons to develop doctoral theses writing.

Moreover, this conceptual framework advances our understanding of how Arab postgraduates construct literature reviews in Computer Engineering. It offers useful strategies for enhancing their rhetorical effectiveness. It also contributes to the broader goal of supporting doctoral candidates in producing theses that meet international standards of scholarly communication and disciplinary.

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