

Self-Assessment Framework for Postgraduate Thesis Writing

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Abstract: *The purpose of this study is to identify the evaluation components for improving PhD thesis writing to mitigate PhD thesis writing challenges. The results of the desktop systematic literature review synthesis process revealed PhD thesis requirements, PhD thesis writing challenges, and PhD thesis solutions resulting in proposing a potential essential thesis writing component. This study found that having personalized PhD thesis milestones (determined by thesis requirements and student requirements) equipped with essential writing thesis skills along with thesis development strategies could improve the student's writing independence. Using the Seven Attributes Framework (SAF) as a foundation for thesis requirement, the results support the essential thesis writing components where it includes (a) thesis attributes comprehension, (b) writing structure mastery, (c) argumentative evidence, and (d) research communication. To address thesis writing challenges, this study proposes independent approaches such as finding external resources, setting thesis milestones, skill development, improving language proficiency, and progressive improvement. Results of this study proposes the development of a self-assessment framework for thesis writing. The benefits include providing PhD students with the essential components so that they could quickly gain skills and understanding to write their thesis and later on graduate. Future studies are recommended to develop ways for the students to acquire these components as well as ways to measure their thesis growth and maturity independently.*

Keywords: thesis writing challenges, thesis writing solutions, thesis writing components, postgraduate students, self-assessment for writing thesis

1. Introduction

PhD students are very much dependent on supervisor's insight and guidance to help them write their thesis. However, supervisors are busy and may not be able to guide students at all times. Given this reliance on supervisors, this study is proposing to enhance PhD students' thesis writing with the aim of empowering them to become more independent learners.

There are various challenges in writing a PhD thesis. Vita & Begley (2023) highlighted the students' superficial understanding of key thesis attributes specifically the 'significant contribution' and 'theory'; and the unidimensional understanding of key thesis attributes 'originality', 'criticality' and 'rigour'. Findings from other literature also include students' confusion about how to provide evidence for thesis attributes (Vita & Begley, 2023) and lack of conceptual and communication clarity (Ramlall et al., 2019). Other challenges in thesis

writing include linguistic errors, improper or limited use of metadiscursive bundles, and of course, writing improwiciency (Li et al., 2024).

Not only PhD students unknowingly struggle with these issues, but examiners also have their own set of challenges when examining thesis writing. For instance, Van den Besselaar & Mom, (2024) found that there is gender bias in awarding Cum Laude, and even the Cum Laude awards were not aligned with thesis quality. Ramlall et.al (2019) found discrepancies in examiner ratings based on examiners' different backgrounds.

From insights found in prior research on these issues, one conclusion can be made is that postgraduate students are incapable of evaluating their own thesis writing. Therefore, this study aims to identify the challenges in thesis writing and look for potential solutions to these challenges experienced by postgraduate students. After the introduction and methodology, this paper presents the systematic literature review synthesis process results. It will conclude by presenting the development of a potential essential thesis writing components.

2. Methodology

The literature review presented in this paper follows the "Systematic Literature Review Synthesis Process" (Masiran et al., 2020; Luo et al., 2022; Zou et al., 2023; Wu et al., 2024; Wong et al., 2024). This process is a stand-alone literature review typology (Rousseau et al., 2008; Templier & Paré, 2015) known to make sense of a selected body of existing literature, leading to decisions regarding the background theoretical context in the early research ideation phase. Topics were identified using Ibrahim's (2008, 2011 & 2020) research question (RQ) construct categorization technique for identifying three different RQ constructs—"WHO," "WHAT", and "HOW"—in formulating the main research question. "WHO "is defined as the element being impacted by the study, "WHAT" is the information or body of knowledge required to solve the problem, and "HOW" is the targeted impact of the study. In this study, "WHO" is PhD thesis, "WHAT" is evaluation component, and "HOW" is improve thesis writing.

This study identified the challenges involved in writing PhD thesis by determining the requirements of PhD thesis. Literature articles were identified through Scopus database using keywords related to the ["phd" AND "thesis"]. The limitations are set to (a) articles published in the year 2017 – 2024, (b) empirical research articles, (c) English language articles, and (d) journal publications. A total of 779 articles were obtained and sorted by relevance. After the title and abstract review, 30 were selected for analysis. The outcomes included the main findings of previous scholars, how their works could support this study, and recommendations to strengthen the potential solution. The findings of analysis were then separated into three subthemes (PhD Thesis Requirements, PhD Thesis Challenges, and PhD Thesis Writing Solutions) based on the importance of their existence, even though some subthemes may not have many academic articles to refer to due to their emerging nature.

The results of this exercise generated a comprehensive overview for each subtheme, which the study further cross-analyzed, integrated the possibilities, and prioritized the potential solution. The prioritized results were then discussed and synthesized further to form a proposed theoretical model as a potential solution to challenges in writing PhD thesis. This study adapted Ibrahim & Mustafa Kamal's (2018) systematic literature review synthesis process documentation using the online EAGLE System.

3. PhD Thesis Writing

Results of the literature review covers PhD thesis requirements, PhD thesis challenges, and PhD thesis writing solution. They are described below.

3.1 PhD Thesis Requirements

This section sheds lights on the PhD thesis requirements by explaining the requirements involving PhD thesis writing. Existing literature reveal the various aspects of PhD programs, including different types of PhDs by publication (Paltridge & Starfield, 2023), PhD approaches (Inouye, 2023), structural components of a PhD (Chong, 2022) and graduate program structures like admission requirements, PhD training content, thesis format, assessment methods, and financial models (Williams et al., 2019). However, none of these studies specifically address the existing inequalities in doctoral provision arising from lack of consistent and coherent thesis policies, as highlighted by Robinson (2023) particularly in Malaysian contexts. Given this gap, this study strongly argues for the establishment of minimum standard for doctoral thesis writing.

Understanding PhD students' profiles such as their PhD program and professional background (Fernandez-Giusti et al. (2021), as well as their post-PhD goals (Inouye, 2023), is crucial for student's development during a PhD journey. Drawing inspiration from Hulme (2022), this study also explores the strategies that students can utilize by examining the formative role of thesis for their development as authors, helping to prepare students for their subsequent careers and employment (Williams et al., 2019). Among other consideration for a PhD journey would be the longevity requirement of PhD theses (Hulme, 2022). This is inline with using Chordal Triad of Agency (Emirbayer & Mische, 1998, in Inouye, 2023) where the past, the future and the present should be taken into consideration to determine appropriate thesis milestones. Chordal Triad of Agency (Emirbyare & Mische, 1998) conceptualize agency as a temporally embedded process of social engagement, informed by the past (in its "iterational" or habitual aspect) but also oriented toward the future (as a "projective" capacity to imagine alternative possibilities) and toward the present (as a "practical-evaluative" capacity to contextualize past habits and future projects within the contingencies of the moment).

After determining their personalized PhD thesis milestones, only then students could find appropriate transferable skills training (Williams et al., 2019). Transferable skills such as research techniques, project management, and paper publications are important in thesis writing (Williams et al., 2019). Furthermore, there are productivity contributors that were identified from literature such as (a) 'co-supervisor with other' relationship (Duarte-Martínez et al., 2022), (b) acquiring experience (Inouye, 2023), (d) encountering critical events (Inouye, 2023), and (d) systematic reviews publication (Dotto et al., 2020). Hence, this study recommends the establishment of key milestones in PhD thesis writing to consider appropriate transferable skills training and productivity contributors.

In lieu of developing transferable skills and personal productivity, this study is proposing a framework for developing the minimum standards in PhD thesis writing. Some of the recommended milestones and related activities are listed in Table 1 below. Furthermore, to ensure the thesis is completed, student's requirements should be included based on Chordal Triad of Agency Theory. To guarantee the milestones are achieved, transferable skills training strategies and productivity contributors are also included for further consideration.

Table 1: PhD Thesis Milestone Considerations and Activities

Milestone Considerations	Thesis Requirements	-PhD types (Paltridge & Starfield, 2023) -PhD approaches (Inouye, 2023) -PhD structural components (Chong, 2022) -Graduate program structure (Williams et al., 2019)
	Student Requirements	Student's post-PhD goals (Inouye, 2023) are shaped by: -Professional background (Fernandez-Giusti et al., 2021) -Future employment requirements (Williams et al., 2019; Hulme, 2022) -PhD program they pursued (Fernandez-Giusti et al., 2021) -Considerations of the longevity and relevance of PhD theses (Hulme, 2022) -Formative role the thesis plays in the author's development (Hulme, 2022)
Milestone Activities	Transferable Skills Training	-Research techniques (Williams et al., 2019) -Project management (Williams et al., 2019)
	Productivity Contributors	-Co-supervisor with other' relationship (Duarte-Martínez et al., 2022) -Acquiring experience (Inouye, 2023) -Encountering critical events (Inouye, 2023) -Systematic reviews publication (Dotto et al., 2020) -Paper publications (Williams et al., 2019)

3.2 PhD Thesis Challenges

This section elaborates on several challenges that could happen during thesis writing. Writing by itself is already a challenge for many, and writing a PhD thesis adds another layer of complexity. Vita & Begley (2023) used Seven Attributes Framework (SAF) in their study and found that students often have (a) a superficial understanding of required thesis attributes, (b) confusion around how to provide evidence of these attributes in thesis, and (c) a unidimensional understanding of key thesis attributes particularly in “criticality”, “originality”, and “rigor”. SAF is a framework of ‘doctorateness’ for the social sciences where the key attributes of an excellent PhD thesis mentioned are criticality, originality, significance of contribution, theory, rigor, structure, and clarity.

In Li et al. (2024), issues such as linguistic errors and competency in PhD thesis writing were identified with an emphasis on the need to extend meta discourse knowledge especially in relation to lexical bundles. Further challenges were found by Ramlall et al., (2019) where conceptual and communication issue was prominent. On the above matters, this study posits they could be resolved through conceptual rigor and clear communication.

Plagiarized PhD thesis could stem from dishonest behavior (Abalkina & Libman, 2020) and may reflect poor thesis management, similar to the poor managerial capabilities identified in political context. This leads the above study to identify strategies to prevent academic dishonesty and improve thesis management throughout the PhD process. In another study, Yakar & Kwee (2021) found lack of research output post-PhD which underscores the need to focus on identifying factors contributing to poor research output during the PhD study period, thereby the researchers proposed to enhance students' research capabilities.

Several studies have highlighted the challenges in evaluating PhD theses. For example, Ramlall et.al. (2019) found discrepancies in examiner ratings based on examiners' different backgrounds (medical vs. non-medical, international vs. national, with or without PhDs). Van den Besselaar & Mom (2024) discovered that cum laude was awarded to theses that did not consistently have a higher quality than non-cum laude theses with significant gender bias identified in the awards process. Despite similarity index being commonly used in many universities to evaluate PhD quality, Kumar (2019) highlights the differences in similarity

index across disciplines by finding that science subjects had the lowest similarity scores while social sciences had the highest.

There are various methods for measuring and defining the quality of a PhD thesis. The Seven Attributes Framework' (SAF) by Vita & Begley (2023) focuses on key attributes of an excellent PhD thesis. The appraisal framework used by Sun & Crosthwaite (2022) measures common thesis writing issues, particularly in introduction, through Create A Research Space (CARS) model. The Creating a Research Space (CARS) model framework was developed by Swales (1990) based upon his analysis of journal articles representing a variety of discipline-based writing practices. Van den Besselaar & Mom (2024) used bibliometric data to assess thesis quality. Kumar (2019) used the similarity index to compare the similarity scores between science and social science theses. Li et al. (2023) analyzed negation by looking at its frequency, distribution, and function between L1 (refers to a person's first language or native language) and L2 (person's second language or additional language learned after the first) PhD students. Ono & Petrić (2022) used move-and-step genre analysis in analyzing direct quotations used. Corpus-based analysis (Wu & Paltridge, 2021) and Hyland's (Swales, 1990, in Wu & Paltridge, 2021) framework analysis was used to compared stance expressions in MA and PhD applied linguistics dissertations/theses.

Several contextual factors were also found to shape thesis writing. For example, Benelhadj (2019) explored how the choice of prepositional phrases is influenced by both disciplinary and personal parameters of context. Similarly, key forms of content integration in PhD theses, such as types of citation transformation - direct quotation, patchwriting, and critical evaluation – are highlighted by Doğan et al., (2018). These forms align with Ono & Petrić (2022) who found that direct quotation plays a crucial role in fulfilling the rhetorical purposes of specific steps such as (a) reviewing previous research, (b) present the analyzed literary work, and (c) making topic generalizations, within PhD thesis introductions.

In another study, Wu & Paltridge (2021) demonstrated that PhD students show a developmental progression in their ability to use stance expressions compared to their MA dissertations, such as employing fewer boosters, mastering a wider set of attitude markers, and displaying an increased ability to assert positions and involving readers in their texts. Their improved ability to use stance expression in academic writing during PhD studies could facilitate thesis writing development. Additionally, the use of negation in thesis writing such as functional uses, interactive dimensions, and interactional dimensions, was explored by Li et. al, (2023). Sun & Crosthwaite (2022) found usage of subtypes of negation (misalignment, cautious detachment, unfulfilled expectation) within CARS model framework, where negations help establish research gaps. Furthermore, their study also found co-occurrences of negation sub-categories with other appraisal resources, emphasizing the complex interplay of these linguistic features during thesis writing (Sun & Crosthwaite, 2022).

In terms of linguistic features, Li et al. (2024) study highlights the importance of meta discursive bundles within lexical bundles focusing on differences in their use between Chinese and New Zealand PhD students. They also examined lexical bundles and sentence-initial bundles further analyzing their use as key linguistic features in PhD thesis (Li et. al, 2024). Therefore, based on these findings, this study would like to recommend developing a standardized and consistent parameter for PhD theses to address the identified challenges with potential mitigation strategies.

In view of the above findings, this study proposes to divide the PhD thesis challenges into four parts: (a) understanding thesis attributes, (b) linking strategies & conceptual challenge, (c) behavior & managerial challenges; and (d) examiner’s challenge. Additionally, this study also found several key strategies that can be utilized to resolve the challenges: (a) foundational strategies of thesis structure, (b) strategies for linguistic and conceptual linkages, (c) managerial and ethical evaluation strategies, and (d) examiner and evaluation strategies. To ensure that the evaluation criteria is clear, standard, and consistent, this study proposes to explore whether these four evaluation criteria may be of help to the PhD students. The four evaluation criteria are broken into core attributes for thesis evaluation which are tools for evaluating linguistic and conceptual clarity, managerial and ethical evaluation measures, and bias and evaluation system. Table 2 shows how the PhD thesis writing challenges could be overcome with key strategies and its evaluation criteria. This table may be valuable especially in benefiting reviewers and students as well.

Table 2: PhD Thesis Writing Challenges, Potential Key Strategies, and Evaluation Criteria

Challenges	Key strategies	Evaluation Criteria
<p><u>Understanding Thesis Attributes:</u></p> <ul style="list-style-type: none"> - Superficial understanding of key thesis attributes (significant contribution, theory) (Vita & Begley, 2023) - Unidimensional understanding of key thesis attributes (originality, criticality and rigour) (Vita & Begley, 2023) 	<p><u>Foundational Strategies of Thesis Structure:</u></p> <ul style="list-style-type: none"> -Metadiscourse knowledge especially in relation to lexical bundles (Li et al., 2024). -Types of citation transformation: direct quotation and critical evaluation as key forms of content integration (Doğan et al., 2018). -Lexical features: TTR, R1 (Xiao & Sun, 2018). -Sentence-initial bundles (Li et al., 2024). -Fulfilling the rhetorical purposes (reviewing previous research, presenting the analyzed literary work, and making topic generalisations) (Ono & Petrić, 2022) 	<p><u>Core Attributes for Thesis Evaluation:</u></p> <ul style="list-style-type: none"> -Seven Attributes Framework (SAF) by Vita & Begley (2023) which focuses on key attributes of an excellent PhD thesis. -Move-and-step genre analysis (Ono & Petrić, 2022)
<p><u>Linking Linguistic & Conceptual Challenge:</u></p> <ul style="list-style-type: none"> -Confusion on how to provide evidence for thesis attributes (Vita & Begley, 2023) -Lack of conceptual and communication clarity (Ramlall et al., 2019) -Linguistic errors (Li et al., 2024) -Writing competence (Li et al., 2024) -Improper or limited use of metadiscursive bundles (Li et al., 2024) -Patchwriting (Doğan et al., 2018) 	<p><u>Strategies For Linguistic And Conceptual Linkages:</u></p> <ul style="list-style-type: none"> -Metadiscourse knowledge especially in relation to lexical bundles (Li et al., 2024). -Types of citation transformation: direct quotation and critical evaluation as key forms of content integration (Doğan et al., 2018). -Sentence-initial bundles (Li, Franken, & Wu, 2024). -Fulfilling the rhetorical purposes (reviewing previous research, presenting the analyzed literary work, and making topic generalisations) (Ono & Petrić, 2022) 	<p><u>Tools for Evaluating Linguistic and Conceptual Clarity:</u></p> <ul style="list-style-type: none"> -Create A Research Space (CARS) model (Sun & Crosthwaite, 2022). -Appraisal framework (Sun & Crosthwaite, 2022) -Hyland’s framework analysis (mentioned in Wu & Paltridge, 2021) -Corpus-based analysis (Wu & Paltidge, 2021)
<p><u>Behaviour & Managerial Challenges:</u></p> <ul style="list-style-type: none"> -Plagiarized PhD thesis (Abalkina & Libman, 2020) -Dishonest behavior (Abalkina & Libman, 2020) -Poor thesis management (Abalkina & Libman, 2020) 	<p><u>Managerial and Ethical Strategies:</u></p> <ul style="list-style-type: none"> -Proper thesis management (Abalkina & Libman, 2020). -Honest behavior (Abalkina & Libman, 2020). -Research output during the PhD period (Yakar & Kwee, 2021). 	<p><u>Managerial and Ethical Evaluation Measures:</u></p> <ul style="list-style-type: none"> -Bibliometric data (Van den Besselaar & Mom, 2024). -Similarity index (Kumar, 2019).

<p><u>Examiner’s Challenge:</u> -Gender bias in awarding Cum Laude (Van den Besselaar & Mom, 2024) -Discrepancies in examiner ratings (Ramlall et al., 2019) -Examiners’ different backgrounds (Ramlall, Singaram, & Sommerville, 2019) -Cum Laude awards not aligned with thesis quality (Van den Besselaar & Mom, 2024)</p>	<p><u>Examiner and Evaluation Strategies:</u> -Linguistic features (Li et al., 2024). -Research output during the PhD period (Yakar & Kwee, 2021).</p>	<p><u>Bias and Evaluation Systems:</u> -Bibliometric data (Van den Besselaar & Mom, 2024). -Create A Research Space (CARS) model (Sun & Crosthwaite, 2022). -Seven Attributes Framework (SAF) by Vita & Begley (2023).</p>
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3.3 PhD Thesis Writing Solution

This section explains the existing and potential solutions that may help students during their thesis writing. It is concerning that discrepancies in examiner ratings were influenced by reviewer’s backgrounds (Ramlall et al., 2019). To address this issue, ‘Seven Attributes Framework’ (SAF), as utilized in Vita & Begley (2023), could be implemented to define the key attributes of an excellent PhD thesis. SAF not only provides transparency in doctoral assessment but also allows students to self-assess their own work against clear criteria. By adopting these attributes, both reviewers and students can benefit from standardized and consistent evaluations, leading to more objective and reliable assessments of thesis.

There is a need to resolve the challenges in thesis writing identified in Vita & Begley (2023), namely superficially understanding of the attributes; confusion in providing evidence of the attributes in thesis writing; and unidimensional concepts of ‘originality’, ‘criticality’ and ‘rigor’. Furthermore, inspired by Mandran et al., (2022), this study provides solutions to equip doctoral candidates in different stages of their thesis work. These solutions aim to help PhD students structure their reflections, improve the relationship with their supervisor, and better manage their thesis work. Infused with the SAF as a guiding benchmark, the above-mentioned solutions could be organized into two parts: (a) parameters of a quality thesis and (b) factors contributing to quality thesis. Both could aid students effectively in navigating the thesis writing process.

The first part is parameters of a quality thesis. To assess the quality of a PhD thesis, it is important to incorporate scientific outcome such as field- weighted journal ranking and citation impact (Rømer et al., 2020). This aligns with finding from Van den Besselaar & Mom (2024) who employed bibliometric data to measure the quality of the PhD theses. Similarly, Kobayashi & Emmeche (2023) also supported the relevance of the thesis research and quality by proxy, where publication serves as indicator of a thesis’s quality. Additionally, a successful doctoral thesis must demonstrate conceptual rigor as well as communicate ideas with clarity (Ramlall et al., 2019).

For the second part which is factors contributing to a quality thesis, this study supports Cannole & Vinot (2020) who posit that the quality of doctoral thesis is influenced by what the candidates do during thesis work and by what they seek to become in their professional careers. Based on Rømer et al. (2020) this study suggests the usage of scientific outcome (field- weighted journal ranking, citation impact) as key indicators of thesis quality. Similarly, this study agrees with Yuan & Liu (2019) in identification of three independent factors influencing the quality of a

doctoral thesis. The factors were the choice of degree type, the impact factor of their published work as a first author, and the accuracy of their reported statistical results.

By combining parameters of thesis quality with key contributing factors, incorporating scientific outcome measures, and addressing the challenges of examiner discrepancies and student confusion around key attributes, a structured framework can be developed to improve both the quality and assessment of PhD theses. This framework is recommended to help standardize evaluations and provide clearer guidance for PhD candidates, ensuring that both academic and professional development are aligned throughout their doctoral journey.

In summary, this study agrees with the key attributes of an excellent PhD called the Seven Attributes Framework' (SAF) by Vita & Begley (2023) as foundation to provide the students with a clear guidance. Such guidance could help in managing their thesis work, structure their reflections, and improve the relationship with their supervisor (Mandran et al., 2022). The seven attributes—criticality, originality, significant contribution, theory, rigor, structure, clarity—would allow the students to assess their own work and even address their own challenges at any stages of their thesis work. Therefore, much specific parameters for the attributes are required towards preparing quality thesis.

4. Discussion

Following the above results, this section further analyzes, combines potentials, and prioritizes the findings from the literature summaries based on the subtheme of "PhD Thesis Requirements", "PhD Thesis Challenges", and "PhD Thesis Writing Solution". It then synthesizes the findings to seek a high-potential solution to resolve the challenges related to PhD thesis writing.

Ibrahim (2011) states that theory is defined as a statement of rule regarding a phenomenon obtained through systematic and verifiable step. In this early research proposal stage, this study's objective is improving the student's writing independence for fulfilling minimum thesis quality. This phenomenon is proposed to be achieved by following these rules: (a) having personalize PhD thesis milestones; (b) equipped with essential writing thesis skills; and (c) incorporating thesis development strategies. The systematic and verifiable steps will be detailed out at a later stage of the future study. Figure 1 shows the development of a theoretical proposition for developing self-assessment framework for writing thesis where having personalized PhD thesis milestones equipped with essential writing thesis skills and incorporating thesis development strategies could improve the student's writing independence by assessing and addressing their own thesis writing challenges for fulfilling minimum thesis quality.



Figure 1: Point of Departure (POD) Tree Diagram for Developing Self-Assessment Framework for Writing Thesis (Adapted from Ibrahim & Mustafa Kamal, 2018)

This study further details the seven attributes framework (SAF) thus mapping the essential thesis writing components to key attributes of an excellent PhD thesis in Table 3. It also maps the thesis development strategies to key attributes of an excellent PhD thesis in Table 4, and maps the essential thesis writing components to thesis development strategies in Table 5. A conceptual framework for developing the proposed essential thesis writing components is illustrated in Figure 2.

Table 3: Mapping Essential Thesis Writing Components to Key Attributes of an Excellent PhD Thesis

Essential Thesis Writing Components	Key Attributes of an Excellent PhD Thesis						
	Cr	O	SC	T	R	S	Cl
Thesis Attributes Comprehension							
Superficial understanding of ‘significant contribution’ and ‘theory’ (Vita & Begley, 2023)			✓	✓			
conceptual issues (Ramlall et al., 2019)	✓	✓		✓	✓		
Writing Structure Mastery							
Writing competence (Li et al., 2024)	✓					✓	✓
Improper or limited use of metadiscursive bundles (Li et al., 2024)	✓						✓
Argumentative Evidence							
Confusion around how to provide evidence (for significant contribution and theory) (Vita & Begley, 2023)	✓	✓	✓	✓	✓	✓	✓
Inaccuracy of reported statistical results (Yuan & Liu, 2019)	✓		✓		✓		✓
lack of understanding or unidimensional concepts of ‘originality’, ‘criticality’ and ‘rigour’ (Vita & Begley, 2023)	✓	✓			✓		
Research Communication							
Linguistic features (Li et al., 2024)							✓
Communication issues (Ramlall et al., 2019)						✓	✓

Note: Cr = Criticality; O = Originality; SC = Significant Contribution; T = Theory; R = Rigour; S = Structure; Cl = Clarity

Table 4: Mapping Thesis Development Strategies to Key Attributes of an Excellent PhD Thesis

Thesis Development Strategies	Key Attributes of an Excellent PhD Thesis						
	Cr	O	SC	T	R	S	Cl
External Resources							
Consistent and coherent thesis policies (Robinson, 2023)	✓			✓	✓	✓	✓
‘Co-supervisor with other’ relationship (Duarte-Martínez, Cobo, & López-Herrera, 2022)	✓		✓		✓		
Skill Development							
Research techniques skills (Williams et al., 2019)	✓		✓	✓	✓		
Project management skills (Williams et al., 2019)	✓				✓	✓	
Thesis management skills (Abalkina & Libman, 2020)					✓	✓	✓
Thesis Milestone							
Paper publications (Williams et al., 2019)	✓	✓	✓		✓		
Systematic reviews publication (Dotto et al., 2020)		✓	✓	✓	✓		
Research output during the PhD period (Yakar & Kwee, 2021)	✓	✓	✓	✓	✓		
The impact factor of published work as a first author (Yuan & Liu, 2019)		✓	✓				
Quality by proxy, where publication serves as indicator of a thesis’ quality (Kobayashi & Emmeche, 2023)			✓				
Progressive Improvement							
Acquiring experience (Inouye, 2023)	✓		✓		✓	✓	
Encountering critical events (Inouye, 2023)	✓	✓			✓		
Language Proficiency							
Direct quotation in fulfilling the rhetorical purposes (Ono & Petrić (2022)			✓	✓			✓
Extend metadiscourse knowledge especially in relation to lexical bundles (Li et al, 2024)	✓		✓	✓			✓
Choice of prepositional phrases (Benelhadj, 2019)							✓
Ability to use stance expressions (Wu & Paltridge, 2021)	✓	✓		✓			✓
Types of citation transformation (Doğan et al., 2018)	✓	✓		✓			✓

Use of negation in thesis writing (Li et al., 2023)	✓					✓
Subtypes of negation (disalignment, cautious detachment, unfulfilled expectation) Sun & Crosthwaite (2022)	✓	✓	✓			✓

Note: Cr = Criticality; O = Originality; SC = Significant Contribution; T = Theory; R = Rigour; S = Structure; Cl = Clarity

Table 5: Mapping Essential Thesis Writing Components to Thesis Development Strategies

Essential Thesis Writing Components	Thesis Development Strategies				
	ER	TM	SD	PI	LP
Thesis Attributes Comprehension	✓	✓			
Writing Structure Mastery	✓	✓	✓	✓	✓
Argumentative Evidence		✓	✓	✓	✓
Research Communication				✓	✓

Note: ER = External Resources, TM = Thesis Milestone, SD = Skill Development, PI = Progressive Improvement, LP = Language Proficiency

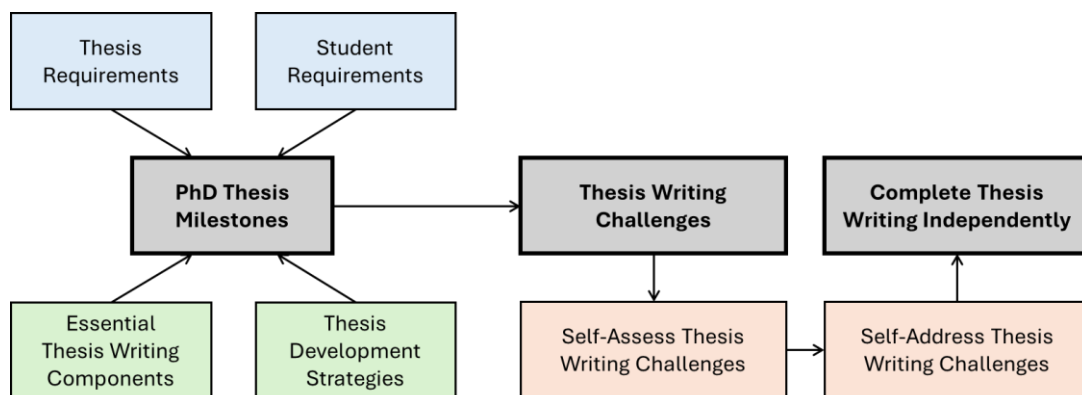


Figure 2: Conceptual Framework for Developing Self-Assessment Framework for Writing Thesis (Adapted from Ibrahim & Mustafa Kamal, 2018)

5. Conclusion

This study has identified the challenges in thesis writing at different developmental stages and has proposed potential solutions for helping PhD students. The results of the systematic literature review synthesis process had covered PhD thesis requirements, PhD thesis challenges, and PhD thesis solutions. Results have proposed having personalized PhD thesis milestones which is determined by thesis requirements and student requirements. The PhD thesis milestones are recommended to be equipped with essential writing thesis skills and thesis development strategies to improve the student's writing independence. The independence comes into play when the writing challenges could be assessed and addressed by the students themselves using the Seven Attributes Framework (SAF) created by Vita & Begley (2023) which are expected to at least fulfill the minimum thesis quality. The synthesis of the above results proposes the development of potential essential thesis writing components (including thesis attributes comprehension, writing structure mastery, argumentative evidence, and research communication) and independent approaches (including finding external resources, setting thesis milestones, skill development, improving language proficiency, progressive improvement) to address thesis writing challenges. Results of this study propose the development of a self-assessment framework for thesis writing.

The benefits include providing PhD students with the essential components so that they could quickly gain skills and understanding to write their thesis and later on graduate. Future studies are recommended to develop ways for the students to acquire these components as well as ways

to measure their thesis growth and maturity independently. Despite this study focuses specifically on PhD theses, the insights derived are intended to be applicable across a broader range of postgraduate research students, providing a relevant foundation for understanding thesis-writing practices beyond the PhD context.

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