UNIVERSITI PUTRA MALAYSIA

LINGUISTIC REALIZATIONS AND LEXICAL BUNDLES IN THE DISCUSSION SECTION OF MEDICAL RESEARCH ARTICLES

YASIR BDAIWI JASIM AL-SHUJAIRI

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By

YASIR BDAIWI JASIM AL-SHUJAIRI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

August 2020

DEDICATION

This thesis is dedicated to
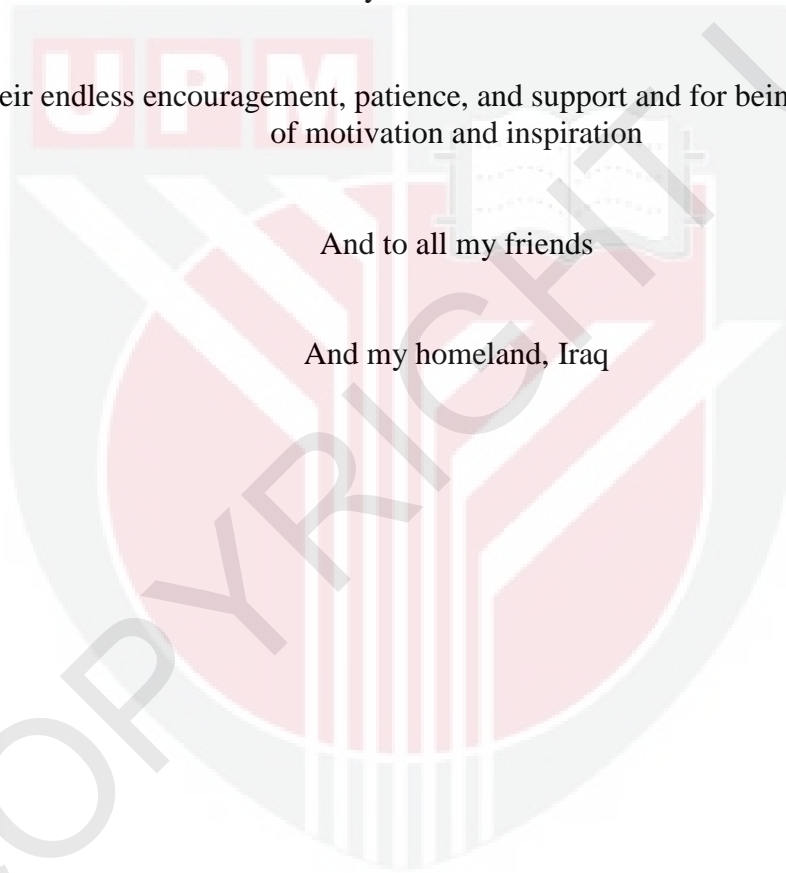
All my loved ones

Especially

My dearest mother

For their endless encouragement, patience, and support and for being a great source of motivation and inspiration

And to all my friends

And my homeland, Iraq

Abstract of the thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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August 2020

Chairman : **Associate Professor Helen Tan, PhD**
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A rhetorical move is a sentence or group of sentences that serves a communicative function in a text while a lexical bundle is a group of words that frequently occur together. Both bundles and moves are considered building blocks and contribute to the construction of meaning in the discourse. Recent studies have been influenced by bundle-move connection approach to combine moves and lexical bundles. So far, literature lacks studies that connect lexical bundles to the moves and steps in the discussion section of RAs (research articles) in the field of medicine. Thus, this research attempted to fill the gap by examining the moves, linguistic features and lexical bundles in the discussion of MRAs.

Concerning the method, quantitative analysis was used to examine the frequency of occurrences in both the moves and the lexical bundles in each move and step while qualitative analysis was used to explain moves, linguistic features and bundles associated with the MRAs' discussion section. The corpus size of this research was 50 discussions of high impact factor RAs in the field of medicine. Additionally, the study employed two analytical frameworks: a model of three moves to analyse the communicative functions and a categorisation of 12 structural patterns for the analysis of the lexical bundles.

The findings of move analysis revealed six moves and nine steps. Move 2 (Highlighting Overall Research Outcome), move 3 (Explain Specific Research Outcomes), move 4 (Contrasting Present and Previous Outcomes) and move 6 (Stating Research Conclusion) were considered obligatory moves as each occurred with a frequency of 100%. Move 1 (Background Information) which is a newly found move had 64% occurrences and thus it was considered a conventional move. The analysis also revealed 2 steps (Referring to Literature and Making a Claim) under move 4 and 4 steps (Strengths and Weaknesses of a Research, Indicating

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Research Limitations, Promoting Further Research and Concluding the Main Results) under move 6.

Concerning the linguistic features, move 1 was realised by procedural verbs (i.e., use, examine) while move 2 was mainly realised by reporting verbs (i.e., show, find), first person plural pronoun and past tense. In move 3, interpreting verbs (i.e., explain, reflect) and causative conjunctions (due to, because) were realised in step 2. In move 4, comparative and contrasting devices (i.e., in contrast and similar to) characterised step 1 and hedges such as modal hedging (i.e., may, might) and hedging verbs (i.e., seem, imply) characterised step 2. The rest of the moves/steps were mainly realised by explicit lexemes (i.e., implications, limitations, strengths, further).

Regarding the lexical bundles identification, the highest number of bundles was associated with move on Highlighting Overall Research Outcome, move 3 step Interpreting the Outcome and move 4 step Referring to Literature. A total of 10 bundles such as *we found that* and *our study shows that* were associated with move 2, 14 bundles such as *the effect of* and *could be due to* were associated with move 3 step 2, and 22 bundles such as *are consistent with,* and *studies suggest that* were associated with move 4 step 1. Apart from these, the results also demonstrated that most lexical bundles are expressed using (Premodifier) Noun phrase + Verb phrase + complement followed by (Premodifier) Copula be + noun/adjectival phrases. Interestingly, the study found new structural categories such as *Noun phrase + passive + (to phrase fragment) and Other noun phrases.

To conclude, the analysis of MRAs discussion section in the present study provides insights into how high impact factor RAs published in high impact journals are written and structured. More importantly, the study yielded two key outcomes. One is the modified framework of rhetorical moves in the discussion section which could be used by future researchers. The second is the generation of a lexical bundle list that is typical to the moves and steps of the discussion.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doctor Falsafah

BENTUK PENYAMPAIAN LINGUISTIK DAN GABUNGAN LEKSIKAL DI BAHAGIAN PERBINCANGAN ARTIKEL PENYELIDIKAN PERUBATAN

Oleh

YASIR BDAIWI JASIM AL-SHUJAIRI

Ogos 2020

Pengerusi : Profesor Madya Helen Tan, PhD
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Pergerakan retorik adalah satu ayat atau sekumpulan ayat yang befungsi sebagai fungsi komunikatif dalam teks, manakala gabungan leksikal adalah kumpulan kata-kata yang sering berlaku secara seiring. Gabungan dan pergerakan dianggap sebagai blok binaan dan merupakan penyumbang kepada pembinaan makna dalam wacana. Kajian-kajian terkini dipengaruhi oleh pendekatan hubungan gabungan-pergerakan dalam menggabungkan pergerakan dan gabungan leksikal. Setakat ini, literatur menghadapi kekurangan kajian yang menghubungkan gabungan leksikal kepada pergerakan dan langkah di bawah bahagian perbincangan dalam artikel penyelidikan (RAs) bidang perubatan. Oleh itu, kajian ini mengisi jurang kajian dengan mengkaji pergerakan gabungan leksikal ciri-ciri linguistik di bawah bahagian perbincangan dalam artikel penyelidikan bidang perubatan.

Mengenai kaedah kajian, analisis kuantitif digunakan untuk mengkaji kekerapan pergerakan dan gabungan leksikal bagi setiap pergerakan dan langkah. Manakala analisis kualitatif digunakan untuk menjelaskan pergerakan dan gabungan ciri-ciri linguistik di bawah bahagian perbincangan dalam artikel penyelidikan bidang perubatan. Saiz korpus kajian ini terdiri daripada 50 bahagian perbincangan dari artikel penyelidikan berimpak tinggi bidang perubatan. Selain itu, kajian ini menggunakan dua rangka kerja analitikal iaitu: model tiga pergerakan untuk mengkaji fungsi komunikatif dan pengkategorian 12 struktur pola bagi analisis gabungan leksikal.

Dapatan analisis pergerakan menunjukkan enam pergerakan dan sembilan langkah. Pergerakan 2 (Penekanan terhadap dapatan keseluruhan kajian), pergerakan 3 (Penjelasan dapatan spesifik penyelidikan), pergerakan 4 (Perbezaan dapatan kini dan sebelum) dan pergerakan 6 (Pernyataan kesimpulan penyelidikan) dianggap sebagai langkah wajib kerana setiap satu berlaku dengan kekerapan 100%.

Pergerakan 1 (Maklumat latar belakang) merupakan pergerakan terbaru yang ditemui mempunyai 64% kekerapan dan oleh itu, ia dianggap sebagai pergerakan konvensional. Dapatan analisis juga menunjukkan 2 pergerakan (Rujukan kepada literatur dan Membuat tuntutan) dibawah pergerakan 4 dan 4 langkah (Kekuatan dan kelemahan penyelidikan, Pernyataan limitasi kajian, Penggalakan penyelidikan lanjut dan Kesimpulan dapatan utama) dibawah pergerakan 6.

Berkenaan ciri-ciri linguistik, pergerakan 1 dinyatakan oleh kata kerja bertatacara (cth; *use*, *examine*). Sementara itu, pergerakan 2 kebanyakannya dinyatakan oleh kata kerja laporan (cth; *show*, *find*), kata ganti nama diri pertama majmuk dan kala lampau. Dalam pergerakan 3, kata kerja tafsir (cth; *explain*, *reflect*) dan kata penghubung penyebab (cth; *due to, because*) dinyatakan dalam pergerakan 2. Dalam pergerakan 4, peranti perbandingan dan perbezaan (cth; *in contrast* dan *similar to*) dicirikan sebagai langkah 1. Kata dolak-dalik seperti kata bermod dolak-dalik (cth; *may. might*) dan kata kerja dolak-dalik (cth; *seem*, *imply*) dicirikan sebagai langkah 2. Pergerakan/langkah yang lain kebanyakannya dinyatakan oleh leksem eksplisit (cth; *limitations*, *strengths*, *further*).

Berkenaan identifikasi gabungan leksikal, bilangan tertinggi gabungan dikaitkan dengan pergerakan Penekanan terhadap dapatan keseluruhan kajian, pergerakan 3 langkah Pentafsiran dapatan dan pergerakan 4 langkah Rujukan literatur. Sebanyak 10 gabungan seperti *'we found that'* dan *'our study shows that'* dikaitkan dengan pergerakan 2, 14 gabungan seperti '*the effect of*' dan *'could be due to'* dikaitkan dangan pergerakan 3 langkah 2, dan 22 gabungan seperti '*are consistent with'* dan '*studies suggest that'* dikaitkan dengan pergerakan 4 langkah 1. Selain itu, dapatan juga menunjukkan bahawa kebanyakan gabungan leksikal dinyatakan dengan menggunakan (Pra-penerang) frasa nama + frasa kerja + pelengkap diikuti oleh (Pra-penerang) kopula '*be*' + frasa nama/ adjektif. Menariknya, kajian ini menemui stuktur kategori terbaru seperti *Frasa nama + pasif + (frasa fragmen) dan frasa nama lain.

Kesimpulannya, analisis kajian terhadap bahagian perbincangan dalam artikel penyelidikan perubatan memberikan pencerahan tentang bagaimana artikel penyelidikan berimpak tinggi terbitan jurnal berimpak tinggi ditulis dan distruktur. Terutamanya, kajian ini menghasilkan dua dapatan utama. Pertama adalah kerangka pergerakan retorik bagi bahagian perbincangan yang telah diubahsuai boleh digunakan oleh penyelidik kelak. Kedua adalah penjanaan senarai gabungan leksikal yang tipikal dalam pergerakan dan langkah di bahagian perbincangan.

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Most importantly, I want to say thanks to my dearest mother and late father. They helped me out of many difficulties in life and provided me with earnest encouragement.

I certify that a Thesis Examination Committee has met on 27 August 2020 to conduct the final examination of Yasir Bdaiwi Jasim Al-Shujairi on his thesis entitled "Linguistic Realizations and Lexical Bundles in the Discussion Section of Medical Research Articles" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the supervisory committee were as follows:

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Date:10 December 2020

Declaration by graduate student

I hereby confirm that:
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Declaration by Members of Supervisory Committee

This is to confirm that:
- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

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LIST OF ABBREVIATIONS

ESP   English for specific purposes

EAP   English for academic purposes

RAs   Research Articles

MRAs   Medical Research Article

LBs   Lexical Bundles

ISI   Institute for Scientific Information

WoS   Web of Science

M   Move

S   Step

IF   Impact Factor

CHAPTER 1

INTRODUCTION

This chapter begins with a review of the background of the study. After introducing the main aspects of this research, the problem statement and the rationale of the study are described. The chapter continues by presenting the purpose of the study, objectives, and research questions. Subsequently, the chapter discusses the significance of the study and shed light on the scope of the research. This chapter ends with a conceptual framework and definitions of several keywords that are employed throughout the research.

1.1   Background

Since the early 1980s, applied linguists and language teachers, especially those concerned with the teaching of English for specific purposes (ESP) and English for academic purposes (EAP), have shown a great deal of interest in genre-centred approaches to analyse written and spoken discourses. This interest in the genre approach has, to a large extent, been motivated by pedagogical concerns, in particular, by the need to provide satisfactory models and descriptions of academic and scientific texts and to enhance the ability of non-native speaker students to understand and, where appropriate, to produce them (Holmes, 1997). Earlier studies of academic and scientific discourse have been indicated to fail in producing relevant and comprehensive accounts of these texts (Bhatia, 1993). Nonetheless, these earlier studies had not been sufficiently comprehensive in highlighting the contents of the scientific and academic texts. Thus, as argued by Bhatia (2008), a more integrated approach to genre analysis is required to produce evidence of knowledge being applied in professional settings.

1.1.1   The Origin of Genre and Genre Analysis in Academic Writing

The word 'genre' derives from the French' genre', which means 'kind; sort; family'. The literary use of this term has not shifted far from this definition, which describes being an important area of study and having the ability to make distinctions within the literature. Tarone et al. (1981) have been the first to use the term, 'genre', in an ESP context when investigating the use of active and passive forms in journal articles related to the field of astrophysics. The published article has further established the principle that the communicative purpose of an author governs the lexical and grammatical levels selected within the norms of the genre studies. This communicative purpose is a feature that defines a genre, such as the academic genre, that distinguishes from other types of genres, such as the literary genre. In the literary genre, the genre of tragedy and comedy are distinguished by the form (Winfield, 2013). For example, comedy is characterised as an escape from reality, while tragedy tends to be serious and intense (Kieran, 2013).

The genre used in ESP is viewed from the perspectives of Miller (1994), and Martin (1989), who argue is a response to achieve a communicative goal for specific rhetorical needs. Every genre carries a communicative purpose, whereby any changes that occur in the communicative function could change the genre (Bhatia, 1993). Thus, the focus is on the extent of communicative purpose that a particular text carries instead of having a system to classify genres being established. This shared series of communicative purpose(s) would create the genre and provide the internal structure that is specific to the genre. The focus in the understanding of genre would, therefore, be as a communicative function within the regular uses of the discourse community. This discourse community is a group of people within a discipline or area of special interest who communicates with each other through the genres that they 'possess' (Swales, 1990, p. 26). There are also expectations of what is permissible within the genre or genres in communication.

The concept of genre, which has recently been adopted in applied linguistics, such as ESP, is an emphasis on the communicative purpose. The purpose can include the ways communicative needs can establish or influence both the surface form and the deeper rhetorical structures. For example, research articles (RA) that are discussed by Swales (1990) are viewed as a member of a single genre once there is a clear communicative purpose. Thus, a genre can also be defined as a set of texts that are characterised by a specific communicative function, which produces distinctive structural patterns. Moreover, Miller (1994), as well as Berkenkotter and Huckin (1995), have described a genre as "typification of social and rhetorical action". Similarly, Martin views genre as "regularities of staged, goal-oriented social processes", which both Swales (1990) and Bhatia (1993) agree in terms of the "consistency of communicative purposes".

A genre is primarily identified and distinguished by the communicative purpose(s). Nonetheless, there are specific categories or sections within the genre that capture the intended communicative function, known as sub-genre. For example, within each section of an RA genre, there is a particular communicative purpose, whereby the introduction section provides introductory information about the topic, as well as present the objectives and the problem that the author(s) is seeking to investigate (Swales & Feak, 2012). On the contrary, the core function of the discussion section, which is also categorised as a sub-genre, is to present and interpret significant findings (Dujsik, 2013). These sub-genres within an RA are a cumulative result from the extended involvement of the professional or the academic community that results in the conventionalised internal structure. Hence, although research writers have the freedom to employ linguistic resources in ways that satisfy the communicative purposes of the articles, the roles and conventions of academic writing should remain within the established structure. This conventionalised structure allows the majority of writers to recognise a specific genre of writing, such as a personal letter, and distinguish the written text from a business letter. Moreover, members of the professional or academic community possess an in-depth knowledge of the conventional purpose(s), construction and use of specific genres than those who are non-specialists.

Genre analysts would argue that the genre-analytic approach in understanding the text structure, and the learning of writing, will result in successful second language/foreign language (SL/FL) written texts. This approach can assist readers in appreciating and in achieving the specific text objectives comprehensively. One of these text objectives is the intended communicative purpose. Thus, the present study believes that through genre-analytic approaches to SL/FL language learning, postgraduates and novice writers will be able to recognise different types of text. Besides, these postgraduates and novice writers will acquire useful information about the nature of different text types, which can eventually assist in writing better, especially of the academic genre, such as RA.

Many studies on genre analysis have examined the various methods that research authors employed in writing a specific section of a text or in formulating arguments at various sections of a research article. These studies are generally carried out using the work by Swales on the introduction section of academic articles (Swales, 1990). One of these research articles has examined the Introduction-Method-Findings-Discussion (IMRD) sections, whereby each of these sections can be viewed as a sub-genre of the research article genre. Each section has been argued to have a distinctive rhetorical writing approach that represents a particular communicative intent.

1.1.2   The Importance and Variations of a Discussion Section in a Research Article

Nowadays, an RA has become the gateway for the exchange of knowledge among researchers from different discourse communities. The growing published RAs, along with the discussion of rhetorical moves in research by Swales (1990) has turned RA into a high-status genre to be examined in various studies in terms of academic writing. One of the most crucial parts among the IMRD sections in an RA is the discussion section, as highlighted by numerous scholars (e.g., Basturkmen, 2012; Dujsik, 2015; Moyetta, 2016). Basturkmen (2012) has stated that the discussion section is essential in RAs, whereby, according to Amnuai (2017), is one of the most demanding sections for researchers, especially for novice writers.

The discussion section of an RA has several functions. Moyetta (2016) asserts that the primary purpose of the discussion section is to state the results and introduce the work of others "for confirmation, comparison or contradistinction" (Swales, 2004, p. 235). On the other hand, Basturkmen (2012) has argued that this section allows researchers to make claims on the integration of the results and state the contributions to disciplinary knowledge. Similarly, Sheldon (2013) also finds that the most substantial claims of a study would be made in this section of an RA. Nonetheless, Dujsik (2015) has noted that the discussion section is focused on presenting and interpreting findings. Therefore, this section is not limited to restating findings from the research but to also explain the results by providing the rationale and example that could support the arguments further. Besides comparing the findings with the literature and providing claims to the findings, the discussion

section would sometimes include limitation, recommendation, and implication of the study.

The reason for the emphasis on this sub-genre in an RA is because researchers (Feak & Swales, 2004; Swales & Feak, 1994) have found the challenge among research writers in writing the discussion section. Among the IMRD sections in an RA, the discussion section is known to be more difficult for novice scholars (Loi et al., 2016) as the information is assumed to go beyond merely stating the aspects that have been conducted and found within a study (Joseph & Lim, 2018). Writers need to structure the discussion section appropriately to make a powerful "closing argument" (Annesley, 2010, p. 1671) by using various information elements, such as research purpose, main findings, interpretations of the results, implications and limitations (Bitchener & Basturkmen, 2006). Besides, many scholars (e.g., Jaroongkhongdach et al., 2012; Swales & Feak, 1994) have stated that the discussion section is challenging and problematic for both novice and native writers due to the argumentative nature of this section. According to Sheldon (2013), the discussion is also the section where writers persuade readers of the novelty in the claims made. Thus, research writers need to meet the cognitive demands in discussing the key areas and to have the skills to write in both persuasive and argumentative styles (Pojanapunya & Todd, 2011). These writers are required to use extensive linguistic knowledge to explain and discuss the findings, which includes the voice of the writer(s) in arguing and supporting the findings. Hence, the mastery of various useful linguistic devices, such as tenses, cohesive devices and academic lexemes, is needed in this section to show the communicative functions clearly. Both sufficient knowledge in the field and adequate knowledge in the language are necessary to express the purposes of a study in a comprehensible way for the readers.

A valuable discussion section should be based on points, instead of facts, as argued by Olsen and Huckin (1990). Facts could be numbers or statements made in the RA, while points would be arguments, reasons, and explanations for further clarifications. Research writers have the benefit of flexibility in deciding the possible points to be included and highlighted in the discussion section. Therefore, discussions should go beyond describing the findings or merely summarising the research results. The discussion section should also be mandatory and can either be a section within an RA or embedded within the result section. Most researchers investigating the discussion section of RAs, have focused on issues, such as disciplinary differences (Holmes, 1997; Hopkins & Dudley-Evans, 1988; Peacock, 2002), as well as local and international journals differences (Amnuai & Wannaruk, 2012; Jalilifar, Hayati, & Namdari, 2012; Sayfouri, 2009). Nonetheless, there is yet to have an in-depth examination of an RA from a single significant discipline, such as medicine through a specific type of journal, such as high impact Institute for Scientific Information (ISI) index.

Previous studies have revealed some significant variations in the structural organisation through a corpus of the discussion section in RA across various disciplinaries. For instance, Holmes (1997) has demonstrated some distinctive features of communicative structure in the research article discussion section within

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the field of social science. Most disciplines abide by the moves in the discussion section of the RAs. Some of the examples are move 2 (Statement of Result), which is common in sociology, move 6 (Generalisation), which is especially prominent in political science texts, move 7 (Recommendation) which is much more frequent in sociology and move 8 (Outlining Parallel or Subsequent Developments) which have occurred only in history articles. Holmes has also found no obligatory rhetorical move in the discussion section of social science RAs. In an investigation that involves 252 discussions, Peacock (2002) has found no obligatory move in all seven disciplines. The study also found three rhetorical moves that have frequently occurred, which are: move 7 (Claim) that occurs almost 90% in all RAs, move 3 (Finding) that shows up at 84%, and move 5 (Reference to Previous Research) that is employed at 73%. Additionally, move 9 (Recommendation) is also popular among RAs at 59%. The study by Peacock has also revealed that moves 5 (Reference to Previous Research), 8 (Limitation), and 9 (Recommendation) are rarely seen in RAs within the physics, as well as environmental science disciplines. In contrast, move 1 (Information) appears more frequently in RAs from biology and physics, and less often in environmental science, language and linguistics. Move 5 (Reference to Previous Research) and move 7 (Claim) are more widespread in physics, language and linguistics. Based on these past two studies, variations in discussions do not only occur within social science disciplines, such as history and sociology but also within challenging science disciplines, such as physics and biology.

Research writers from various disciplines should be made aware of the similar structure used in the discussion section. For instance, the discussion section in RAs from the field of computer science usually contains two significant moves, which are Statement of Result and Recommendations for Further Research (Posteguillo, 1999), while other moves that have been proposed by Swales (1990) tend to occur less frequently. In the medical discipline, Highlighting the Overall Research Outcome, Explaining Specific Research Outcomes, and Stating the Research Conclusion are the three main moves in constructing the discussion section (Nwogu, 1997). Additionally, Kanoksilapatham (2005) finds two apparent moves in the discussion section of RAs in biochemistry, which are Contextualising the Study and Consolidating the Results, while other moves, such as the Limitation of the Study and the Recommendation for Further Research, are less employed. In the field of social science, Lewin et al. (2005) have observed three common moves that are employed in the discussion section, which are Reporting Results, Evaluating the Findings, and Offering Interpretations. Results from past studies show that the discussion section can display a variety of moves across various disciplines. Moreover, differences in the discussion structure are not only limited to disciplinary variation as the communicative structure of RAs that are published in various types of journal may also be different.

Journals that are indexed in an international database, such as Thomson Reuter and Scopus, are considered to be of high-quality as these journals are accessible to publish an RA for both native and non-native speakers of the English language (Jalilifar et al., 2012). Hence, these journals will have a larger audience, whereby research writers who intend to prove the significance of studies and the contributions would aim to publish their work in these internationally recognised journals. These

journals are also acknowledged by high impact factor (IF); a measure of frequency for an article in the specific journal to be cited within a particular year (Garfield, 1972). This frequency of cited articles would be calculated to rank the impact factor of the journal in the field of research. On the other hand, local journals which are not indexed and recognised in the international database would not be able to reach the broad audience. This type of journals has, therefore, a low IF and fewer research writers would choose to publish in these journals. Although similarities may exist in terms of the length (word number) of the discussion section in both international and local RAs, the differences in the communicative function that the discussion section serves might occur (Jalilifar et al., 2012; Sayfouri, 2009).

Sayfouri (2009) has examined the rhetorical moves in the discussion section for a variation of RAs of both ISI (recently, Thomson Reuters/ WoS) and non-ISI, which provides an indexing database of major international journals and proceedings. A corpus of 32 medical research articles (MRAs) was analysed based on Nwogu's (1997) model, which he has revealed to have similar frequencies in the employment of moves and sub-moves for both ISI and non-ISI. Similarly, Amnuai and Wannaruk (2012) have also compared international journals and Thai journals through 60 applied linguistics RAs for the discussion section. Following the methodology used by Sayfouri (2009), the study has found similarities between the two types of journals in the writing moves that involve analysis. However, differences are found in the writing steps of this level, whereby RAs in Thai journals have shown high employment of step 1 (Make Suggestions) and step 3 (Draw Pedagogic Implication) in move 7 (Deductions from Research) compared to international journals. Despite the minor differences, the structure of the discussion section between international and local journals are similar. Another significant finding by Jalilifar et al. (2012) in comparing the discussion section of RAs published in local Iranian non-ISI journals and international ISI journals is the variation in the employment of move 5 (Referring to the Previous Studies). The research writers for non-ISI journals tend not to refer to past studies, which is one of the main functions of the discussion. These low occurrences of references in non-ISI RAs within the discussion section also implies that the writers may not have considered the importance of comparing the results with previous studies. In addition to the similarities and differences between the types of journals, further studies are needed to examine the characteristics of ISI, which is currently known as WoS indexed RAs.

Some researchers would likely publish in non-internationally indexed journals due to the speed in publication and minimal adherence to the conventions of writing in an academic paper compared to ISI and Scopus journals. Most of these researchers do so for the sake of promotion at the workplace or institution. Other researchers may lack the knowledge of writing a research article and the skill needed to write academically, which affects the confidence to publish in high impact indexed journals. Sometimes, these researchers have been previously rejected from ISI journals and therefore, choose to publish in non-indexed ISI journals.

Writers should be aware of the organisation and structure of RAs, which require adequate writing skill due to the argumentative nature in the discussion section.

Writers need to interpret findings, provide an explanation, and compare the study with the literature. Hence, the current research seeks to examine the discussion section of RAs in high impact factor journals within the field of medical science based on a study by Nwogu (1997) and an up-to-date corpus-based analysis. The outcome of this study hopes to enlighten novice writers on the rhetorical moves of the discussion section, as well as to have linguistic awareness in assisting the intended communicative function(s).

1.1.3   Moves and Steps as Text

A rhetorical move is generally viewed as a function of a specific segment in a text (Ruiying & Allison, 2003). The move can be a sentence, group of sentences or a paragraph that serves one or multiple communicative functions in a text. On the other hand, a step is a precise rhetorical mean that is employed to reveal and address the multiple functions of a move (Ruiying & Allison, 2003). Thus, a step is at a lower level than a move, which functions as an 'elaborator' of a move.

Every rhetorical move that has been discussed and explained earlier can be found in a text. A text is referred to as "any passage, spoken or written, of whatever length, that does form a unified whole" and is "best regarded as a semantic unit" (Halliday & Hasan, 1976, pp. 1–2). Some particular features that characterise texts can help to distinguish the different types of writings. These features are crucial to establish the properties of text in English and distinguish a text from a non-linked set of sentences. As a unit of languages instead of grammar, such as a sentence or clause, a text could not be defined based on the size. According to Halliday and Hasan (1976), "a text is best regarded as a semantic unit, which is a unit not of form but of meaning". Therefore, a text is related to a sentence or clause through linguistic awareness instead of size. A text is not merely a group of sentences, but are shaped by or encoded in sentences through the use of a certain function that is carried and realised by a sentence group of sentences. A text has "linguistic features which can be identified as contributing to the total unity and giving texture" (Halliday & Hasan, 1976: 1-2). As a rhetorical move/step is treated as a text, there must be certain linguistic features that identify and form the communicative purpose of each move and step.

1.1.4   The Linguistic Realisations

Although move analysis has provided valuable insights on the rhetorical organisation or communicative purposes that are typically found in different sections of scientific RAs, novice research writers still need to know the linguistic devices that are used to express those communicative purposes conventionally. Some of the essential linguistic realisations for communicative functions are verb tense, voice, self-mention devices, modals, and academic vocabulary, which are considered explicit lexemes (Doró, 2013; Kanoksilapatham, 2005). Consequently, move analysis is often complemented by rhetorical/grammatical analysis.

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Numerous studies have attempted to identify the distributions and functions of selected linguistic features in expressing the rhetorical moves in a particular text. These studies focus almost exclusively on syntactic grammatical and/or lexical features of written texts. On the other hand, researches investigating lexical or grammatical items in scientific RAs include analysis of the use of grammatical tense (e.g., Doró, 2013; Tu & Wnag, 2013), grammatical voice (e.g., Tseng, 2011), hedging (e.g., Farrokhi & Emami, 2008; Loi & Lim, 2019; Livytska, 2019), and reporting verbs (e.g. Agbaglo, 2017; Yeganeh & Boghayeri, 2015). However, few studies have examined all these aspects simultaneously (i.e., Amnuai, 2019; Nguyen, 2018; Pho, 2008; Suntara, 2018). All these studies have investigated the linguistic realisations in the abstract section of an RA. Thus, this current research seeks to examine the linguistic devices on the moves and steps in the discussion section of high impact MRAs.

According to Qin (2014), one characteristic of academic writing is the frequent use of formulaic language, which is an essential linguistic aspect that can contribute to text cohesion and function. Formulaic language has also been referred to as a recurrent or fixed-word combination, multiword lexical chunks, as well as formulaic sequences. The present research focuses on one form of formulaic language, which is the lexical bundles (LBs), that writers frequently use to express ideas. Every rhetorical move in the discussion section of an RA could be identified and distinguished by the LBs, which are typically used at every move/step in writing.

1.1.5   Lexical Bundles

Biber et al. (1999) have defined lexical bundles as recurrent sequences of three or more words or a group of words that frequently occur together. The term "lexical bundles" is repeated by Biber et al. (2004. p. 22) as "the most frequently occurring lexical sequences in a register". The frequency of occurrences in these sequences and the number of words in lexical bundles are not fixed. Thus, a text could have three, four, five or even six-word bundles. Moreover, these LBs can either be complete phrases, which meaning can be derived from specific parts in a sentence, such as *on the other hand* or incomplete units, such as *at the end of*.

Lexical Bundles have also been viewed as "important building blocks of discourse" (Biber & Barbieri, 2007, p. 263), and are employed to express a stance, organise a discourse, and frame a referent. The frequency of these bundles, nonetheless, varies between registers. While spoken language has a higher frequency of LBs than written language (Biber et al., 2002), Biber and Barbieri (2007) have found writing in course management, and instructional registers, have a higher frequency of bundles than the spoken registers when investigating specific registers that are used in a university. Previous studies (e.g., Biber et al., 1999; Biber et al., 2004; Hyland, 2008b) have categorised LBs by structural characteristics that are generally focused on noun phrases, prepositional phrases, and verb phrases. These studies have found that structural use of bundles can also vary according to the discipline. Research writers in the fields of biology and electrical engineering use bundles that include

passive verbs more research writers in applied linguistics and business (Hyland, 2008b). Hence, this research seeks to examine the form and the structure of LBs in the rhetorical moves of the discussion section in MRAs.

1.1.6 The Role of Lexical Bundles in Academic Writing

In the past few decades, many studies have examined the organisation of communicative purposes across genres. However, only a few studies (Kanoksilapatham, 2003; Ruiying & Allison, 2003; Swales, 1981) have been carried out to determine the list of expressions associated with the different sections of an RA. Every section in an RA has a set of moves that help to convey the communicative purposes of the RA (Kanoksilapatham, 2003). For instance, Swales (1981) has found that research writers use expressions, such as *the purpose of this study*, or *the aim of this research* to express the move for *stating research objectives* in the introduction section. Thus, the relationship between the move and the type of expression can help the audience to interpret the communicative purpose. Hence, the most frequent expressions (words combinations) utilised in the rhetorical moves within RAs can be of great assistance to research writers, particularly novice research writers.

Lexical bundles are seen as building units of discourse (Biber & Barbieri, 2007a) and are also considered to be crucial for fluency in speaking and writing. Previous literature has proven that knowing LBs is an indication of being a professional language user (Biber, 2009; Cortes, 2004; Karabacak & Qin, 2013; Yeganehjoo & Thai, 2012). *In terms of the, on the other hand, as a result of* and *as can be seen* are some examples of LBs being used in RAs. Based on the importance of LBs in language teaching and learning, several studies have examined the employment of LBs in academic settings (e.g., Biber et al., 2004; Hyland, 2008a; Kashiha & Chan, 2014, 2013) and in daily conversations (Biber et al., 1999). On the other hand, studies such as by Cortes (2004) has revealed that students use fewer four-word LBs in academic writing that are frequent in published RAs that are written by experts within the field of history and biology. This result proves that professional academic writers rely significantly on the employment of LBs in writing.

1.1.7 Lexical Bundles and Rhetorical Moves

Being able to identify the frequently used LBs of the rhetorical moves and steps in various sections of RAs can benefit writers across disciplines with a better understanding of lexico-grammatical features in the formulation of academic discourse communities. Several studies in the past (e.g., Bal, 2010; Choi, 2015; Farvardin et al., 2012; Jalali & Moini, 2014) have shed light on the formulaic expressions within RA writing. However, minimal studies have been conducted to examine the employment of such formulaic expression in rhetorical moves of various sections of an RA. Among these studies, Cortes (2013) has examined LBs in the rhetorical moves of the introduction section, while Kashiha (2015) has investigated on LBs in the rhetorical moves of the conclusion section. Cortes asserts

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that a group of LBs is exclusively linked to a writing move or a step in the move and a second group occur across several moves and steps. On the other hand, Kashiha (2015) believes that although a group of LBs does belong to only one move or a step of the move, a number of bundles are not found in any of these writing moves or steps. The bundles are typically used in the conclusion section for specific functions, such as organising the language in the RA or giving a reference.

In a recent study, Mizumoto, Hamatani, and Imao (2017) have applied the Bundle-Move Connection Approach to examine writing moves and LBs in sections of RAs within the field of applied linguistics. A web-based support tool for research article writing has been developed to help writers select appropriate LBs for each rhetorical move in writing a research article. However, the study has some shortcomings as the findings are based only from the field of applied linguistics. Also, the study has focused only on examining 4-word LBs, whereby shorter or larger strings of phrases have been ignored. Moreover, as the study has analysed all IMRD sections of RAs, a number of shared bundles that can be employed in more than one move within different sections have also been included in the investigation. Thus, to the knowledge of this present study, the current literature lacks studies that examine the rhetorical moves and various forms of lexical bundles in the discussion section of RAs within the field of medicine.

Writing the discussions for the findings of a study demands time and effort from research writers to plan the ideas that not only involve explaining the findings but also comparing the findings with the literature, indicating the significance of the findings, and stating the limitations and implications of the study. These communicative purposes require research writers to be creative in writing and to provide a strong argument for the research. Therefore, novice research writers may need to have sufficient knowledge of LBs to initiate and construct these rhetorical moves. By determining LBs in the rhetorical moves and steps of the discussion section in an RA, the extent of expressions being frequently employed to formulate rhetorical moves can be observed.

The relationship between rhetorical moves and lexical bundles is viewed as building blocks that are used in the construction of discourse. Hyland (2008b) maintains that bundles have been increasingly considered as "important building blocks of coherent discourse and characteristic features of language use in particular settings" (p. 8). Rhetorical moves and steps are also deemed to be building blocks in communicating the purpose of the discussion section. Biber, Connor, and Upton (2007) state that the types of writing move can be the "main building blocks" of a genre (p. 53). Dudley-Evans (1995) views these rhetorical moves to be an inherent part of a genre that can be taught to novice research writers in producing a well-organised text in a particular genre successfully. Nonetheless, both lexical bundles and rhetorical moves have similar features. Thus, LBs would be distinguished as lexico-grammatical building blocks associated with basic functions employed to bind the text together, while rhetorical moves would be "segments of discourse that provide the building blocks of texts" (Biber et al., 2007, p. 9). A description of the relationship between LBs and writing moves in a particular register could also provide more evidence on the

tendencies of organisational and lexico-grammatical patterns being used to build discourse by different speech communities. The relationship between LBs and rhetorical moves in different academic registers need to be examined due to this lack of evidence.

1.1.8   High Impact Factor Research Articles

An impact factor (IF) is measured as the extent of a scientific journal is significant within a discipline. According to scholars (e.g., Martın, 2003; Pho, 2008; Vladimirou, 2007), high IF RAs are representative samples of professional writing. The higher the IF, the more widely read the journal is, and therefore, the more likely other researchers will cite a research paper published in the journal (Wallwork, 2016). The present research is focused on RAs from high impact journals and, therefore, assumes that the research writers are familiar with and adhere to the international conventions and constraints of these high IF journals (Dobakhti, 2016). Thus, high IF journals demand high-quality language from articles to be published (Cardinali, 2015).

Khansari (2016) states that high IF journals generally displays well-written RAs. Thus, this study focuses on analysing the structure and language use, specifically in the discussion section of high IF RAs in the field of medicine. A study by Jin (2018) that has examined the variation language use in the discussion section from high impact and low impact RAs within the field of chemical engineering finds research writers of high IF journals commented more research findings than those of low IF research. The present research assumes that high IF may contribute to the quality of structure and language use in scientific RAs.

Writers of scientific research and medical sciences need to know the conventions of the genre for publication. Most students undertaking doctoral research in the field of medicine are under constant pressure to publish research in reputable high IF journals, which is currently an academic policy among high ranking universities (Reddy et al., 2016). Thus, candidates who are enrolled in a Master or Doctoral programme in these universities would be required to publish in ISI (Web of Science) indexed journals. Moreover, international publications and indexed citation have become crucial requirements for hire, promotion, and tenure of academic staff and postgraduates (Flowerdew & Forest, 2009).

1.1.9   The Importance of Rhetorical Moves and Lexical Bundles to Novice Writers

The organisational patterns of RAs differ in not only the sections but also the disciplines. Peacock (2002) and Samraj (2008) have shown that the organisation in RAs varies between disciplines. Hence, Zhu (2004) believes that the rhetorical organisation of an RA should not be taught as a steady structure for learners from

various disciplines. Therefore, the structure of moves in RAs from the field of medicine is investigated in this study.

Several factors play a significant role in the process of research publication, such as the structure (e.g., literature review, report of methods, findings, and discussion) of an RA (Flowerdew et al., 2005). Research writers have to be aware of the stylistics, and linguistic structure in a research article to be accepted in high impact journals. Research findings published in ISI indexed journals also provide the researchers with opportunities to have a voice in the international academic community, and in some cases, a representation of perspectives from the home country. Hence, novice research writers who wish to gain recognition internationally will have to adopt the writing conventions of prestigious international high-ranking journals.

The genre of research articles consists of sub-genres known as sections, such as introduction and methods. One crucial section is the discussion, which is the focus of this present study. Being aware of the communicative function in the moves and steps to the discussion section are crucial to structure and organise the writing that contributes to the quality of research. Nonetheless, although a framework on the moves and steps for RAs in the medical field has been introduced in the literature (Nwogu, 1997), a new modified model is needed as the genre of RA could change over time (Li & Ge, 2009). Besides, novice research writers would also benefit from having a comprehensible template of rhetorical moves and steps that are relevant with time. Knowing the formulaic language can expand the mental lexicon into developing ideas that are succinct to the rhetorical moves for the discussion section. Novice research writers should be able to comprehend lexical bundles to write a well-structured discussion section that is clear and effective in presenting the communicative functions of this section.

1.2   Problem Statement

Several studies in the literature (e.g., Fryer, 2012; Huang, 2014; Li & Ge, 2009; Nwogu, 1997; Sayfouri, 2009) have been done to analyse the rhetorical structure in the discussion section of MRAs. However, these studies are either archaic (e.g., Nwogu, 1997; Skelton, 1994) or the findings have been based on a considerably limited corpus (e.g., Fryer, 2012; Huang, 2014). For instance, Fryer (2012) has examined 16 MRAs and Huang (2014) has analysed only 5 MRAs. One would argue that the small corpus of the same genre and discipline can produce sufficient qualitative data for the purpose of analysis (Fuertes-Olivera, 2015; Yang et al., 2015). However, those mentioned studies included only frequencies and percentages of the found moves and steps. It is known that quantitative analysis of such corpus size would limit the generalisations of the results. Paltridge (2013) has also stated that the 'communicative purpose of a genre … may evolve over time, change, expand, or shrink' (p.348). Similarly, Li and Ge (2009) have stated that medical research articles (MRAs) have witnessed significant structural and linguistic changes in the last two decades. For instance, the move that highlights overall research outcome has changed from "obligatory" in the 1985–1989 RAs (corpus A) to

"optional" in the 2000–2004 RAs (Corpus B). Also, Huang (2014) asserts that the lack of studies on MRAs results in an undefined structure for researchers in this field to publish MRAs. Therefore, further study with larger and up-to-date corpus in medical sciences RAs is needed to analyse the rhetorical moves and steps in the discussion section.

The changes over time could also occur in the use of linguistic features. Li and Gi (2009) have reported not only structural changes over time, but also highlighted linguistic changes in the genre under investigation. For instance, there is a significant increase in move 3 on the use of simple past tense (corpus A 37.11% versus corpus B 75.58%) but a sharp decrease in the employment of the present perfect tense (corpus A 26.81% versus corpus B 3.49%). In addition, the first person plural pronoun *we* was higher in corpus B than in corpus A. This finding could be due to the preference of researchers in explicitly having a voice in the arguments made and be more recognised by the scientific community. Another example, Melissourgou et al. (2019) compared the linguistic realisations used between a medicine corpus of 1965, 1985 and 2015. They found that the use of initial conjunctions such as *however*, *thus*, and *therefore* increased from 9 occurrences (per 10,000 words) in 1965 to 23.5 in 2015. Also, similar to Li and Gi (2009), a sharp increase in the use of first person plural pronoun was noticed. Assuming that linguistic changes may occur over time, this research also aims to examine the linguistic features that are employed in the rhetorical moves of MRAs.

A limited number of studies have investigated LBs and the structural features in research articles and more specifically, in the writing moves of various sections in an RA. Recent studies (e.g., Abdollahpour & Gholami, 2019; Alamri, 2015; Hong, 2019; Wongwiwat, 2016;) have investigated the employment of LBs in constructing the rhetorical moves and steps of different RA sections. The most crucial argument that is made among these studies is "the relationship between LBs and moves needs to be further developed not only in introductions but also in other sections of RAs" (Cortes (2013, p.42). This finding is based on the bundle-move connection approach that is developed to investigate bundles in writing moves of the introduction section in an RA across 13 disciplines. Other studies, Kashiha (2015), as well as Abdollahpour and Gholami (2019; 2016) have investigated the relationship between the bundles to writing moves in the conclusion and abstract sections of applied linguistics RAs. These studies have recommended further explorations the association between LBs and moves based on confirmed results of connections between both the variables.

Besides, the literature lacks studies on LBs and rhetorical moves in the discussion section of MRAs. Previous studies (e.g., Kashiha, 2019; Mizumoto, 2017; Omidian et al., 2018) that have examined LBs in rhetorical moves have focused mainly on 4-word bundles. Li et al. (2020) stated that 5-word strings form a stronger bundle-move connection. Also, Cortes (2013) confirmed that 5-word bundles carry more information and are more probably accounted for a single move than multiple moves. This research, therefore, seeks to associate 3- to 5-word lexical bundles with the rhetorical moves in the discussion section of RAs within the field of medicine.

Another gap is that the linguistic devices within rhetorical moves have not been incorporated with LBs. Past studies have not focused on the relationship between these aspects and instead, have been tackled separately. Some studies, such as Arsyad et al. (2020), Jin (2018), as well as Sadeghi and Alinasab (2020), have focused on rhetorical moves, while others have examined moves and linguistic realisations (e.g., Amnuai, 2019; Liu & Buckingham, 2018; Lubis, 2019). A handful of studies, on the other hand, only explored the lexical bundles in RAs (e.g., Jalali & Moini, 2018; Safarzadeh et al., 2015). Few studies have investigated lexical bundles in the moves from the conclusion section (Kashiha, 2019), introduction section (Cortes, 2013) and abstract (Omidian et al., 2018) of RAs. However, to date, there had been no investigations made on the relationship between moves, linguistic devices, and lexical bundles. Thus, the current research aims to incorporate the rhetorical moves, linguistic devices and lexical bundles from the discussion section of high IF RAs in the field of medicine.

1.3   Research Purpose

The present research aims to analyse the LBs in terms of the rhetorical moves and steps in writing the discussion of high impact RAs within the field of medicine. The appropriate employment of the LBs in the discussion section is crucial to clarify and recognise the writing moves and steps in developing this section. A combination of three words or more can form a bundle that serves a specific function in the text that is used by writers to help form a writing move and step in a sentence to carry a communicative function. Moreover, the appropriate use of LBs might differentiate between the communicative function of every rhetorical move and step in the discussion section of RA. Therefore, building a list of frequent LBs can help to formulate the rhetorical moves required in the discussion section of RAs. In short, this research seeks to investigate the rhetorical moves, their functions and linguistic features, and the lexical bundles that are found in the discussion section of RAs within the field of medicine. As this research attempt to examine the text type and the formulaic expressions of a quality journal, only the discussion section of RAs published in high impact ISI indexed journals within the field of medicine are investigated. The specific objectives of the current research are:

1.   To identify the rhetorical moves and steps in the discussion section of high impact MRAs.
2.   To examine the functions and the linguistic realisations of the rhetorical moves and steps in the discussion section of MRAs.
3.   To explore the lexical bundles employed within the moves and steps in the discussion section of high impact MRAs.
4.   To investigate the structural features of the lexical bundles used within the moves and steps in the discussion section of MRAs.

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1.4 Research Questions

1. What is the essentiality of the rhetorical moves and steps in the discussion section of high impact MRAs?
2. What are the functions and the linguistic realisations of the moves and steps found in the discussion section of high impact MRAs?
3. How can lexical bundles play a role in constructing the rhetorical moves and steps in the discussion section of MRAs?
4. What are the structural features of the lexical bundles used in the rhetorical moves and steps in the discussion section of MRAs?

1.5 Significance of the Study

Three major aspects contribute to the significance of this current research. First, findings from this research can assist research writers in writing a comprehensive discussion section in a way that meets the expectation of the international academic community, whose shared primary language would be the English language. Thus, these writers would have the knowledge of the steps that must be taken to write an effective discussion section by exploring the obligatory, conventional and optional rhetorical moves and steps that construct a well-organised discussion section. Eventually, writers would also be conscious of the functions in the rhetorical moves within this section, and the preferred moves, as well as patterns, to be employed in writing the discussion section.

Moreover, by identifying and analysing the lexical bundles that are used to construct the moves and steps of the discussion section, writers of MRAs will have a list of LBs that can help in writing the discussion section. Direct and explicit learning of the frequently-used LBs will also help learners to develop academic reading and writing abilities (Cortes, 2006). Although the knowledge of the rhetorical moves and steps alone might not be of much use to novice research writers, these writers should be aware of the rhetorical moves that are carried in the discussion section. There would also great emphasis placed on research writers in knowing how these moves and linguistic devices could be used to reveal the various functions to suit the intentions. A lexical bundle is one type of linguistic devices. Hence, when learners possess a large supply of these formulaic expressions, tasks can be simplified as these stored sequences need little encoding work, and learners have more time to devote to other more constructive language activities. Therefore, research writers are in need of a list of LBs that can help construct each move and step to differentiate the function of a particular move from the other. By doing so, novice writers will be able to come up with a more organised and clearly written discussion section that can be fully understood by readers and serve the communicative purpose.

Finally, to date, there is no model that has focused on the discussion section being introduced since the framework introduced by Nwogu in 1997. Hence, most novice researchers can learn to write a discussion section by reading and imitating other RAs within the same field of study. Besides, findings from the current research could

assist in writing a well-structured discussion section in the English language, in terms of moves, steps and LBs that are linked with each identified move. Furthermore, the model can be easily employed to the teaching of academic writing, mainly in the ESP classroom.

1.6   Scope of the Study

Among the sections in a research article; introduction, literature review, methodology, findings, discussion, and conclusion, this study has only focused on one section, which is the discussion section. The reason is that this section is the most crucial section among the IMRD sections (Amnuai, 2017; Liu & Buckingham, 2018), whereby research writers usually find challenging to write (Feak & Swales, 2004; Loi et al., 2016). Also, this section is considered to be challenging and problematic for both novice and native writers (Jaroongkhongdach et al., 2012; Swales & Feak, 1994b).

Secondly, the current research has also focused only on the medicine discipline. Thus, other disciplines are not included in this study. The field of medicine has unique importance among other fields of science through the IF of the journals. Within this community that specialises in science, the impact factor is often associated with the concept of high impact that is derived from a rating used by the Institute for Scientific Information (ISI), which calculates the number of times a journal is cited by another journal (Bollen et al., 2009). Today, high impact publishing is defined as highly cited papers, whereby publishing in a high impact factor journal will positively influence the number of citations. The community in medical science views this achievement to be of quality in both the research and the researcher (Matarese, 2010). According to the Journal Citation Report (JCR), the average IF of the top 10 journals in the broad field of medicine is 27.881 compared to the top 10 journals in other fields, such as arts and humanities, whereby the IF of its top 10 journals is only 6.464. The reason could be that the field of medicine is related to human physical health, whereby the fate of humanity is affected in a particular way by the success of new discoveries in medical science. As a result, the readership of medical journals is definitely larger to have not only the discourse members but also members of the public.

As medicine is related to human health, unlike other science disciplines, the readers of MRAs may also be the general public besides the professional experts. For example, patients could seek help regarding diagnosis via online resources, which may be in the form of magazines, reports and published RAs. Thus, RAs in the field of medicine must be carefully written in a language that can be clearly comprehended by both academicians and the public. However, Severance and Cohen (2015) have concluded that medical journal abstracts are currently becoming more challenging to read, which could result in the discussion section to be more challenging to be understood considering the argumentative nature of this section, which requires higher linguistics skills to be clearly written. Any miscomprehension by readers can have significant adverse consequences. Writing a comprehensible and

well-organised piece of writing can positively contribute to the readability of the RA. Published RAs on medicine should be very well structured, organised, and written with the use of formulaic and straightforward expressions (lexical bundles). Hence, the focus of this current research is on the field of medicine.

Third, journals that have a low IF or not indexed in the Institute for Scientific Information (ISI) database are not considered in the present research. The corpus of this research has been constructed from the database of high impact ISI journals, which has been recently acquired by Thomson Reuters and renamed as Web of Science (WoS) (Meho, 2007). Thomson Reuters (Web of Science) indexed databases are the most recognised indicators of published and cited RAs (Rauhvargers, 2013). According to Li, Rollins, and Yan (2018), a core component of the ISI WoS is the IF in journals, which has been redefined by Tome and Lipu (2004) as a measure of the frequency for an 'average article' in a journal to be cited in a particular year. According to Najman and Hewitt (2003), "article citation count is often used synonymously with research quality" (p. 64). Hence, the IF for research can also be associated with quality. Besides, Cardinali (2015) has noted that journals of high IF have high demands on the language in RAs being published. As a result, high IF gives the representation of well-written research (Khansari, 2016), which can be assumed as a representation of well-written RAs in the field of medicine. As this research aims to develop a new and revised framework of the writing moves a list of LBs that can serve as a model in writing the discussion section for novice research writers, only RAs with high impact factor are selected for the analysis in this research.

1.7   Conceptual Framework

This research seeks to investigate the rhetorical moves and steps, the linguistic realisations, and the lexical bundles that are associated with each move and step in the discussion section of high IF MRAs. Figure 1.1 demonstrates the conceptual framework of the study.
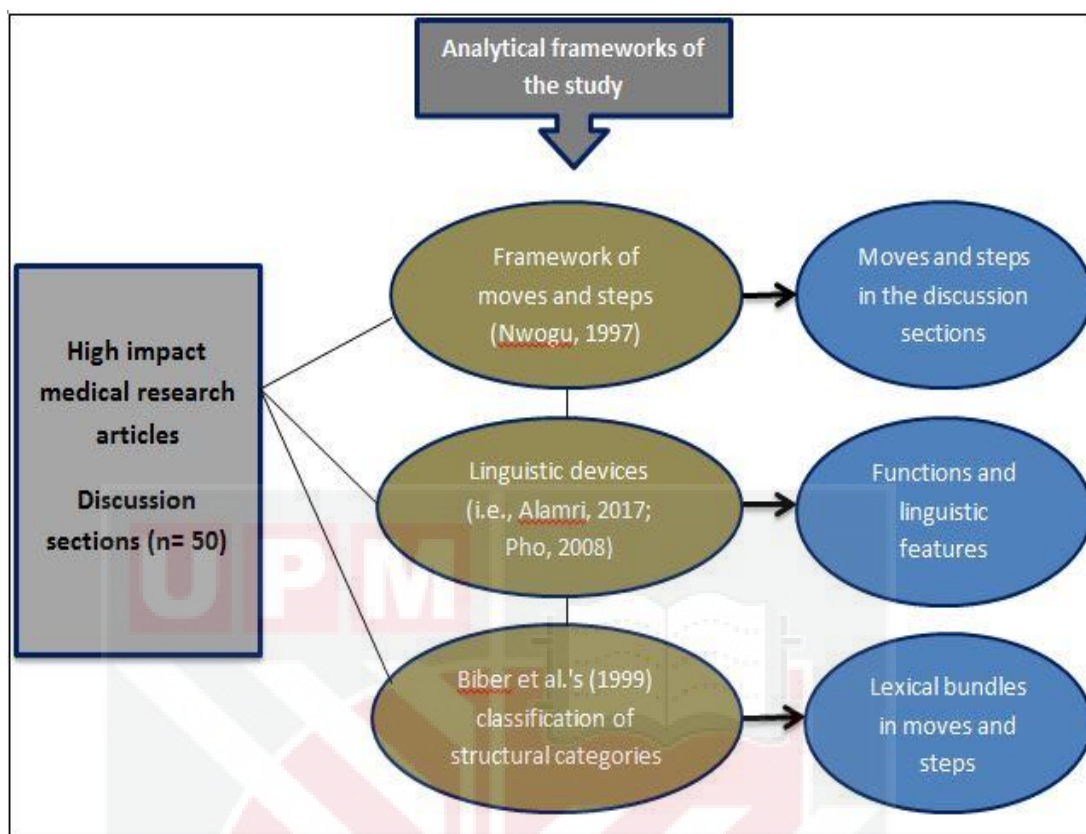
Figure 1.1 : Conceptual Framework of the Study

The corpus of the study is the discussion section of high IF RAs in the field of medicine. The study is investigating the rhetorical moves and steps of the discussion sections based on the adapted framework of Nwogu (1997). On the other hand, the researcher is examining the functions and the linguistic features of the moves and steps in the corpus based on the adapted list of linguistic devices proposed by previous scholars (Alamri, 2017; Doró, 2013; Hyland, 2005; Kanoksilapatham, 2005; Pho, 2008; Vassileva, 2001). In addition, Biber et al.'s (1999) classification is also adapted to analyze the structural categories of the identified lexical bundles in the moves and steps of the discussion corpus.

1.8   Definition of Key Terms

Discussion Section is one of the sections in a research article, which come after or is included in the section on findings. In this section, research writers usually discuss findings, compare the results to the previous studies, make a claim(s), and/or recommend further studies in this section. The discussion section in this present study is treated as a sub-genre under research articles genre.

Rhetorical Move is a sentence or group of sentences that are coherent in the communicative function within a written or spoken context. Every rhetorical move

serves as a particular communicative purpose. Combining these moves can create the communicative purpose of a text as a whole.

Step is a precise rhetorical means used to realise the multiple functions of a move. A step is at a lower level than a move to function as an 'elaborator' of a move.

Communicative function is the purpose of the communication. It is what an individual intentionally trying to convey. In other words, it is a message that is intended for a specific community.

Essentiality is a measure to the extent of a move being necessary for the genre under investigation. A move/step is obligatory when it occurs in 100% of the corpus, conventional in between 60%-99%, and optional in less than 60% (Kanoksilapatham, 2005).

Linguistic Features are lexical and grammatical devices such as *tense, voice, hedges, self-mentions, reporting verbs,* and *other explicit academic lexemes*. These linguistic features are usually used in academic writing to realise the function of a text and make it meaningful.

Lexical Bundle is a formulaic expression of a combination of three or more words that frequently occur in a language. A lexical bundle is considered an essential building block of written and spoken academic discourse, its' meaning may reflect a move/step function in a text.

Structural categories are referred to as the grammatical forms of lexical bundles that are classified into groups according to grammatical structures. In this study, the structural categories are the preferred grammatical forms of the lexical bundles that are employed by the authors of the selected MRAs.

Impact Factor is a type of measurement that has been created by the Institute of Scientific Information (ISI) and adopted into the Journal Citation Report (JCR). The impact factor would be a result of the number of times selected articles are cited within the last two years. This measurement is meant to evaluate the relative importance of scientific journals, whereby the higher the impact factor, the more highly ranked the journal would be.

ISI is an abbreviation for the Institute for Scientific Information. It is an index database, which has been acquired by Thomson Reuters and is currently known as Web of Science (WoS). This publication and citation database covers all fields of science, which becomes an invaluable tool in bibliometric analysis.

1.9   Summary of the Chapter

This chapter has provided background information on the nature of the research by introducing the two core aspects, which are the rhetorical moves and LBs. The significance of these aspects and the role in academic writing has been discussed. Furthermore, the problem statement and the rationale of the research have been presented. An explanation of the aim and the main objectives in the current research are also provided subsequently. This chapter comes to an end by stating the scope and significance of the study and defining the key terms.

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