



Research Article Writing: A Review of a Complete Rhetorical Organisation

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ABSTRACT

The need to write for scholarly publications has triggered many investigations into research articles published in reputable and indexed journals. This paper attempts to compile and provide a review of the complete rhetorical organisation of research articles, from *Abstract, Introduction, Method, Results* to *Discussion* sections, from several studies. Though the studies revealed a general pattern in the writing of these research articles, it was also noted that different disciplines adopt certain localised structures, which characterise the discourse of the disciplines. Thus, this paper calls for the discovery of local structures of research articles from more disciplines to cater for the growing demands for scholarly publications, especially amongst researchers, academicians and postgraduates.

Keywords: Genre Analysis, Research Articles, Rhetorical Organisation, Corpus-based

INTRODUCTION

As a prerequisite for a paper to be published in an international journal, it must be written in English. Writing a quality English research paper is a major challenge for the Non-Native Speaker (NNS) academicians (Zamri, Yusof,

Junid, & Adnan, 2012). It has become the main reason for the low number of publications by Malaysians in international scholarly journals. Universities in many countries have required their academicians and researchers to publish research articles in international journals for career advancement. Several prestigious universities in China, for instance, have also stipulated that their doctoral candidates must have at least one paper accepted in an international journal before graduating (Hyland, 2007).

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The Malaysian scholars' contributions in international publications were relatively small from the year 1996 to 2012. From the SCImago Journal and Country Rank data, Malaysia had only 99,187 items of international publications compared to its neighbours, Singapore, which had 149,509 and Thailand with 82,209 publications. Different genres acquire different structural patterns and language use; researchers who wish to succeed through international journal publications need to acquire awareness of differences in text structures (Briones, 2012; Zand-Vakili & Kashani, 2012). Research articles have been a medium used by the academicians to communicate new knowledge to members of the academic community (Hyland, 2007). With the growing need for internationalisation of academic communities, academicians need to develop awareness and mastery of writing for publications in order to get their papers published in international journals, thus, gaining international recognition.

This paper provides a review of the studies on the structural patterns and organisations of the elements in research articles (RAs). It is revealed that although there is a general pattern in the research articles writing, it is also noted that different disciplines adopt certain localised structures, which characterise the discourse of the disciplines. The structure and organisation of the contents of the RAs are different according to the disciplines to which the RAs belong to.

STUDIES ON RESEARCH ARTICLE WRITING: A REVIEW

Genre Analysis

A genre has been defined as “a type of text or discourse designed to achieve a set of communicative purposes” (Swales, 1990). A genre is more often defined as a kind of text which relates form, function and context (Paltridge, 2001). In the writing of research articles, there are specific patterns and organisations of the RAs that most of researchers follow. Different disciplines have different cultures; thus, different organisations are adopted in writing the research articles. In order to ensure a research article is accepted in a scholarly publication, the standard organisation, textual patterns and language use in writing the research article should be adhered to. There are variations in textual pattern and organisation of research articles applied by different disciplines (Hyland, 2007). Previous research on genre revealed that researchers across disciplines applied the Introduction–Method–Results–Discussion (IMRD) standard (Ling Lin, 2012). This IMRD framework has been a reference for many authors, including those writing for scientific and technical research papers.

Move Analysis

In the academic writing genres, the Move Analysis is one of the methods used by researchers in identifying the connections of ideas in a paper (Li, 2011). A move involves the segment made from a communicative function in a text (Wirada Amnuai, 2013). The Move Analysis has

also been employed by researchers to study culture variations in research articles. Different cultures are reflected by different language styles and structures in research articles writing. Swales (1990) proposed a framework for the move analysis known as CARS (Create a Research Space). Research into the organisation of research articles has been using the move-based analysis, including studies on all sections in research articles (Nwogu, 1997; Posteguillo, 1999; Kanoksilapatham, 2005). Some of the studies focused on a discrete section of the research article, such as the *Introduction* (Habibi, 2008; Han Ping, 2010; Pedro, Martin, & Martin, 2009; Safnil, 2013), *Method* (Kallet, 2004; Lim, 2006), and *Discussion* sections (Holmes, 1997; Wirada Amnuai, 2013). Many researchers have also used this framework to analyse the structure of research articles from specific disciplines. The move-based analysis has been regarded as a tool in conducting a genre study (Ding, 2007).

Corpus-Based Analysis in Genre Studies

A corpus-based method is useful for obtaining a real language sample; it serves the needs of the target groups (Supatranont, 2012). Many corpus-based investigations have been conducted in language for specific purposes (LSP) involving genres or related concepts such as registers, text-types, domain, style, sublanguage, message form and the like (Lee, 2001). With the potential offered by corpus analysis, genre studies are becoming more extensive and interesting. Different syntactic patterns or

moves in different sections of article can be observed from a comparative study between sections in article writing (Bowker & Pearson, 2002; Cross & Oppenheim, 2006). By comparing a specific corpus with a general one, a variety of rhetorical patterns can be identified (Gavioli, 2005). In a different study, some groups of words in scientific abstracts reliably display a certain type of move (for example, the verb *show* commonly appears in the evaluation section) (Orasan, 2001). The potential of corpora to capture local characteristics of a language such as features of genres, promotes corpus work to complement genre studies (Noorli, 2011). Hence, this study is an attempt to compile and review corpus-based analysis of the RAs.

STUDIES ON THE RHETORICAL ORGANISATION OF RESEARCH ARTICLES

Previous studies on the rhetorical organisations of research articles have been on discrete sections of the articles (Holmes, 1997; Kallet, 2004; Lim, 2006; Ding, 2007; Flowerdew, 2008; Pedro Martin Martin, 2009; Han Ping, 2010; Supatranont, 2012; Safnil, 2013; Wirada Amnuai, 2013). Thus, this section compiles and reviews the findings from several studies on the rhetorical organisation of sections in research articles, from *Abstract*, *Introduction*, *Method*, *Results*, to *Discussion*. These studies are all corpus-based and adopt the research article rhetoric structure from the linguistics field as proposed by Swales in Table 1.

The framework proposed by Swales is one of the established frameworks and is acknowledged as a seminal move model for identifying rhetorical structure of RAs (Graham, Milanowski, & Miller, 2012).

TABLE 1
RA Structure

Abstract	Method
Move 1: Introduction	Move 1: Describing data collection procedure/s
Move 2: Method	Step 1: Describing the sample
Move 3: Results	(a) Describing the location of the sample
Move 4: Discussion	(b) Describing the size of the sample/ population
	(c) Describing the characteristics of the sample
	(d) Describing the sampling technique or criterion
Introduction	Step 2: Recounting steps in data collection
Move 1: Establishing a Territory	Step 3: Justifying the data collection procedure/s
Step 1: Claiming centrality	Move 2: Delineating procedure/s for measuring variables
Step 2: Making topic generalization	Step 1: Presenting an overview of the design
Step 3: Reviewing items of previous research	Step 2: Explaining method/s of measuring variables
	(a) Specifying items in questionnaires/databases
Move 2: Establishing Niche	(b) Defining variables
Step 1A: Counter Claiming	(c) Describing methods of measuring variables
Step 1B: Indicating Gap	Step 3: Justifying the methods of measuring variables
Step 1C: Question-Raising	(a) Citing previous research methods
Step 1D: Continuing Tradition	(b) Highlighting acceptability of the method/s
Move 3: Occupying Niche	Move 3: Elucidating data analysis procedure/s
Step 1A: Outlining purposes	Step 1: Relating or recounting data analysis procedures
Step 1B: Announcing present research	Step 2: Justifying the data analysis procedures
Step 2: Announcing principle findings	Step 3: Previewing results
Step 3: Indicating RA Structure	
Results	Discussion
Move 1 Preparatory information	Move 1 Background Information
Move 2 Reporting results	Move 2 Reporting Result
Move 3 Commenting on results	Move 3 Summarising Result
(a) Interpreting results	Move 4 Commenting in Result
(b) Comparing results with the literature	Step 1: Interpreting Result
(c) Evaluating results	Step 2: Comparing Result with literature
(d) Accounting for results	Step 3: Accounting for result
Move 4 Summarising results	Step 4: Evaluating result
	Move 5 Summarising the Study
	Move 6 Evaluating the Study
	Step 1: Indicating Limitations
	Step 2: Indicating Significance
	Step 3: Evaluating Methodology
	Move 7 Deductions from research
	Step 1: Making Suggestions
	Step 2: Recommending further research
	Step 3: Drawing pedagogic implications

ABSTRACT

An *Abstract* is basically a summary from the whole research paper (Noorli, 2011). It consists of information that indicates the whole study of the research (Yang & Allison, 2003). It is important to ensure that the *Abstract* contains the needed information

of the theoretical knowledge and significant features of the research. Numerous studies on the *Abstract* section from different disciplines adopted the IMRD framework. However, there are also studies which do not adopt the framework; the researchers initiated new theoretical frameworks (Table 2).

TABLE 2
Studies on RA Abstract Section

<i>Authors</i>	<i>Corpus (no. of articles)</i>	<i>Disciplines</i>
Han Ping, 2010	20	Computer Security, Computer Language
Samraj, 2005	12	Wildlife Behaviour, Conservation Biology

Han Ping (2010) compared the abstracts of RAs from two different disciplines; Computer Security and Computer Language. The findings showed that the *Abstracts* from the two disciplines included *purposes, results and conclusions*. *Abstracts* from both disciplines displayed similar macrostructures as proposed by Swales (1990) in Table 1. As for the Computer Security discipline, the “claim of centrality” in the *Abstract* formed the integral part of the section. However, the Computer Language discipline did not apply the “claim of centrality” in their *Abstract* section due to the field of Computer Language itself is a mature field in computer science and technology, thus, it explains the absence of the move (Han Ping, 2010).

Therefore, there are moves in the *abstract* section of a research articles that depend on the characteristics of the field. Based on the above studies, there are moves (for example “claim of centrality”) which are not included in the *Abstract* section. According to

Melander *et al.*, (1997) “such tactiness and taciturnity” could be a characteristic of *Abstracts* from more “mature” research area and the move is not applicable in the *Abstract* section.

Samraj (2005) studied the *Abstract* section from RAs of the Wildlife Behaviour and the Conservation Biology disciplines using the Swales’s *Abstract* section framework as in Table 1. The results revealed that the Conservation Biology research articles included the “claim of centrality” in the *Abstract* section but this was not applicable in the Wildlife Behaviour discipline. It is mainly due to the same factor as in Han Ping’s study, where the Wildlife Behaviour is a mature field, and the persuasive elements are not included in the *Abstract* section of the papers.

INTRODUCTION

An analysis on the structure of the *Introduction* section has become an interest among many authors. Research on the *Introduction* section has rapidly increased

since Swales proposed a framework in writing the *Introduction* section of RAs. The framework, i.e. CARS (Create a Research Space), consists of 3 main moves: (1) Establishing a Research Territory, (2) Establishing a Niche, and (3) Occupying a Niche (Table 1).

Each of the moves proposed consists of steps or sub-moves within it. The

framework is similar with the framework proposed for the *Abstract* section (Table 1). According to Swales (1990), the *Introduction* section is an integral part of an RA and it also acts as a promotion medium between the author and the reader to deliver the message, and to attract the readers' interest on the knowledge they are about to share.

TABLE 3
Studies on the RA Introduction Section

<i>Authors</i>	<i>Corpus (no. of articles)</i>	<i>Disciplines</i>
Samraj, 2002, 2005	12	Wildlife Behaviour, Biology
Suharno, 2011	20	Science
Habibi, 2008	60	ESP, Psycholinguistics, Sociolinguistics

Adapting Swales' *Introduction* framework, Samraj (2005) figured out that in the *Introduction* section of the Wildlife Behaviour RAs, although the moves were generally similar with the moves proposed by Swales (Table 1), the "claim of centrality" move did not appear frequently. In contrast, the "claim of centrality" move seemed to be a compulsory move for the Biology RAs. Suharno (2011), on the other hand, found that most of the Science RAs did not adopt the Swales' *Introduction* framework.

Habibi's (2008) study of the *Introduction* section in ESP, Psycholinguistics and Sociolinguistics RAs revealed a similarity in the moves; the authors of these three disciplines applied Move 1 *Establishing a territory* in their *Introduction*. Habibi also posited that the CARS model cannot be fully adopted in the RAs of these disciplines as different

disciplines apply different structure of the *Introduction* section.

METHOD

The *Method* section in RAs plays an important role in providing the readers the information on the validity of the study and the descriptions of the procedure taken during the research (Kallet, 2004). The *Method* section should include the specific research procedure, material and analysis. Without the *Method* section in an RA, the author might not be able to convince the readers on how the findings were obtained and the validity of the research itself (Lim, 2006). The author also may rely on the *Method* section to firm up their way on reporting the findings of the research in the *Result* section and trash out any possible doubts on how the findings were obtained and how accurate the result would be (Lim, 2006).

TABLE 4
Studies on RA Method section

<i>Authors</i>	<i>Corpus (no. of articles)</i>	<i>Disciplines</i>
Brett, 1994	20	Sociology
Nwogu, 1997	15	Medical
Kanoksilapatham, 2005	12	Biochemistry
Lim, 2006	20	Business Management
Yang & Allison, 2003	20	Applied Linguistics

A number of research on the *Method* section have adopted the Swales *Method* framework (Table 1). However, Lim (2006) improvised the *Method* section structure of the Business Management RAs, as shown in Table 4. Lim found additional submoves and moves within the method section framework. Lim’s framework proposes that the method used in collecting data should be explained more in detail, as given in Table 5.

TABLE 5
Lim’s framework of Method section

<i>Rhetorical moves</i>	<i>Constituent steps</i>
Move 1: Describing data collection procedure/s	Step 1: Describing the sample (a) Describing the location of the sample (b) Describing the size of the sample/population (c) Describing the characteristics of the sample (d) Describing the sampling technique or criterion Step 2: Recounting steps in data collection Step 3: Justifying the data collection procedure/s (a) Highlighting advantages of using the sample (b) Showing representatives of the sample
Move 2: Delineating procedure/s for measuring variables	Step 1: Presenting an overview of the design Step 2: Explaining method/s of measuring variables (a) Specifying items in questionnaires/databases (b) Defining variables (c) Describing methods of measuring variables Step 3: Justifying the methods of measuring variables (a) Citing previous research methods (b) Highlighting acceptability of the method/s
Move 3: Elucidating data analysis procedure/s	Step 1: Relating or recounting data analysis procedures Step 2: Justifying the data analysis procedures Step 3: Previewing results

The RAs of the three disciplines: sociology, medical and biochemistry (Table 4), displayed an almost identical structure of *data collection - measuring variables - data analysis* (Brett, 1994; Nwogu, 1997; Kanoksilapatham, 2005), which is similar to Swales’ *Method* section framework. However, the Applied Linguistics RAs did not seem to adopt Move 2 *Measuring variables* of the Swales’ (Yang & Allison, 2003). The results prove the variation in the move patterns in the *Method* section across the disciplines.

RESULTS

There have not been many studies on the *Result* section in an RA. In addition to Swales', another framework for the *Results* section derived from the Applied Linguistics RAs has been proposed by Yang and Allison (2003), as shown in Table 7. They stated that the *Result* section is one of the important parts of an article (Yang & Allison, 2003). The moves and steps of the *Result* section in the Applied Linguistics field are the same with those in the *Result* section in Computer Science and Medical research articles (Nwogu, 1997; Posteguillo, 1999), which explain that the Results section in different

fields tends to have the same features. Brett (1994) reported that in any field, this section is the place where the new findings are commented and highlighted by the authors.

A study of the Sociology and Organic Chemistry RAs by Bruce (2009), however, interestingly showed that the moves applied in the RAs seemed to be different from the framework proposed by both Swales (Table 1). The differences arise on how the results were presented. This is probably due to the availability of many established experimental procedures in the field; therefore, the justification of the procedures has to be made (Bruce, 2009).

TABLE 6
Studies on RA Result section

<i>Author</i>	<i>Corpus (no. of articles)</i>	<i>Disciplines</i>
Bruce, 2009	20	Sociology & Organic Chemistry
Lim, 2006	20	Business Management
Williams, 1999	8	Medical
Yang and Allison, 2003	20	Applied Linguistics

TABLE 7
Yang and Allison's Framework of Result section (Yang & Allison, 2003)

<i>Moves</i>	<i>Steps</i>
Move 1 Preparatory information	
Move 2 Reporting results	
Move 3 Commenting on results	e) Interpreting results f) Comparing results with literature g) Evaluating results h) Accounting for results
Move 4 Summarising results	
Move 5 Evaluating the study	a) Indicating limitations b) Indicating significance/advantage
Move 6 Deductions from the research	a) Recommending further research

DISCUSSION

The *Discussion* section in an RA explains how the results can contribute to new disciplinary knowledge (Holmes, 1997;

Yang & Allison, 2003; Samraj, 2005; Safnil, 2013). Table 8 shows some of the research focusing on the *Discussion* section of RAs.

TABLE 8
Studies on RA Discussion section

Author	Corpus (no. of articles)	Disciplines
Safnil, 2013	47	Social Science
Holmes, 1997	30	History, Political Science, Sociology
Wirada Amnuai, 2013	60	Linguistics
Yang and Allison, 2003	20	Linguistics

Safnil (2013), in his study on Social Science RAs of the *Discussion* section, found that most results and discussion sections were collapsed into one section. There was no particular section for the discussion. Thus, the discussion section for the Social Science RAs differs from the framework proposed by Swales. Holmes (1997), on the other hand, looked into the *Discussion* structure of the History, Political Science and Sociology RAs, and identified a similarity between the Political Science and Psychology *Discussion* structures; both started with the *Background Information* (Move 1). As for the History RAs, Move 1 is not used and the *Discussion* section

in the History is rarely cyclical and also seldom has reference to the previous research findings (Holmes, 1997).

Yang and Allison (2003), in their study of the *Discussion* section of the Linguistics RAs, found that the RAs did not seem to follow the *Discussion* section framework proposed by Swales (Table 1). Some of the moves in the *Discussion* section were cyclical; not only the author explains about the results, he/she also comments on it. Therefore, some submoves were added into the framework proposed by Swales. They came up with an improvised framework in Table 9.

TABLE 9
Yang & Allison's framework of Discussion section (Yang & Allison, 2003)

Moves	Steps
Move 1 Background information	
Move 2 Reporting results	
Move 3 Summarizing results	
Move 4 Commenting on results	(a) Interpreting results (b) Comparing results with literature (c) Accounting for results (d) Evaluating results
Move 5 Summarizing the study	
Move 6 Evaluating the study	(a) Indicating limitations (b) Indicating significance/advantage (c) Evaluating methodology
Move 7 Deductions from the research	(a) Making suggestions (b) Recommending further research (c) Drawing pedagogic implication

CONCLUSION

The writing in the research articles consists of scientific communication elements, which depend heavily on writers' ability to explain and interpret their findings and use appropriate language in the fields. The main goal of writing a research article is to help readers and viewers understand the concept and ideas that the writers intend to propose. Therefore, academicians need appropriate writing skills to ensure that new knowledge they have explored can be shared with other academic communities and readers.

The review of studies on all the sections in the RAs in this paper has proven that though there is an identified general organisation outlined such as that by Swales, the different disciplines possess different cultures in presenting and interpreting the information; thus, differences in the organisation of RAs are inevitable from one field to another. As such, studies on writings from RAs of disciplines are very much required, not only to understand and identify the similarities and differences in the organisations of the RAs, but more importantly to ensure that the knowledge intended to be shared by the writers can be presented and read in readily available structure and organisation which can boost readers' understanding of new knowledge.

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