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**Genre, Schema, and the Academic Writing Process: An enquiry into
the generalisability of generic structure and its relationship to
schematic knowledge**

by

Mohamed Al-Ali

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A thesis submitted in partial fulfilment of the requirements for the degree
of Doctor of Philosophy

University of Durham

Department of Linguistics and English Language

1999



17 JAN 2000

Declaration

I declare that this theses, which I submit for the degree of Doctor of Philosophy at the University of Durham, is my own work and is not the same as any which has previously been submitted for a degree in this or another university.

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Abstract

Genre, Schema, and the Academic Writing Process: An enquiry into the generalisability of generic structure and its relationship to schematic knowledge

Mohamed Al-Ali, University of Durham, 1999

The objectives of this thesis are threefold: First I will show how proponents of *genre* have described the notion of register as an outmoded field specific construct to promote a notion of a genre having the power to cut across disciplines. Second, it will show how far Swales' (1990) notion of genre can be conceived as cross-disciplinary or to what extent the *field* component of *register* imposes itself on genre in order to produce a discipline specific structure. Third, I will find out how far RA writers are aware of the text structure they employ in their writing and whether there are any indications of these structures as having been internalised as schemata.

The thesis engages in a theoretical discussion of genre and shows how the notion has developed out of the fields of literary criticism, socio-psychology and socio-linguistics. It looks at the difficult distinction between genre and register and seeks to disambiguate their conflated relationship in order to provide a full role for each in the analysis of text. In order to investigate the cross-disciplinary status of genre, a move analysis is carried out upon a corpus of 16 RAs selected from different disciplines. This analysis is based upon Swales' (1990) framework. In a series of semi-structured interviews, the deduced move structure was given greater validity by its being agreed with the RA writers themselves. These interviews were also used in order to gain a sense of writers' states of awareness of the rhetorical structures that they employ in the process of writing.

The results of the study are threefold: First, the data analysis indicates disciplinary variations in the type and complexity of move structures contained in each RA section. While these moves meet discipline specific functions, a sense of a common, generic structures tend to appear. Second, there is some confirmation as to the postulated existence of a relationship (Swales, 1990) between schematic and generic structure. Third, our study suggests that RA genre texts need to be modelled out of a balance between the generic knowledge and discipline specific needs.

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1. Introduction

The study of generic models in written texts has been an area of growing interest in applied linguistic analysis and English for Specific Purposes (ESP) in the last two decades. Genre analysis has shown that the generic structure of a group of texts, say, research articles, is different from that of laboratory reports, which is in turn different from the generic structure of proposals. Genre category membership varies according to the purpose, structural patterns and audience of the text. The hypothesis that texts belonging to the same genre selected from different disciplines can have similar rhetorical organisation and linguistic exponents to realise these structural patterns has become an influential research area. Originating in the 1980s, this trend has developed as a response to the pedagogical needs of non-native learners and native speakers of English as well 'because their communicative labors can be considerably reduced if they have empirically produced models to follow' (Dubois, 1997: 3).

The growing interest in genre analysis research can be primarily attributed to its concern with practical pedagogical purposes. The pedagogical implications of the study of genre, according to Swales (1981, 1990) and Bhatia's (1993) views, reside in helping non-native speakers master models of genre rhetorical structures together with the linguistic exponents used by the writers to realise these structures. Swales points out that exemplar texts of a single genre selected from a wide variety of fields show a high degree of overlap in their rhetorical structures. The pedagogical implication of this is that the rhetorical structure of a given text can be taught to students, and they, in turn, are to reproduce similar exemplars after mastering the taught model. Thus, Swales (1981) perceives himself as a

'more prescriptive teacher than the majority of my ESP colleagues. In the present context... I will be requiring my students to demonstrate to my satisfaction that they can communicate effectively within the confines and constraints of the models I have constructed' (p. 88).

A thriving tradition of genre analysis relevant to different distinct genres (e.g. research articles, case reports, review articles, abstracts, and reports) has been principally concerned with improving students' writing and reading abilities and with preparing materials and models for teaching. Some researchers have focused on certain linguistic exponents such as '*that* – nominals', aspect, tense, modality, voice, thematic flow, and hedges, etc., and their rhetorical functions across the divisions of certain genres (West,



1981; Heslot, 1982; Oster, 1981; Hanania and Aktar, 1985; Malcolm, 1987; Gosden, 1992; and Salager-Meyer, 1992, 1994). Such attempts, which were restricted to lexico-grammatical features at the sentence-level of the generic texts, have been described as a bottom-up analysis. ESP teachers expect that the communicative functions of the research article (RA) sections affect the frequency and choice of particular linguistic forms. Thus they anticipate that writers commonly select some lexico-grammatical exponents more than others to indicate the communicative purpose of a particular genre section.

In a number of other studies, the researchers endeavour to account for the rhetorical and linguistic evolution of particular genres (Shapin, 1984; Dear, 1985; Bazerman, 1984; Berkenkotter and Huckin, 1995; Dudley-Evans and Hendsen, 1990; and Atkinson, 1992; 1996).

Aiming at pedagogical generalisations, other scholars attempt a 'top-down' approach to describing certain sections of particular genres (e.g. Introductions, Methods, Results and Discussion sections of the research article) or the rhetorical structure of the whole genre. In particular, many of these genre analysis studies have investigated the generic organisational structure of the RA Introduction sections (Swales, 1981; 1990; Cooper, 1985, and Crookes, 1986; Dudley-Evans and Henderson, 1990). This is attributed to the reason that the RA Introduction 'seems relatively easy to deal with' (Hopkins and Dudley-Evans, 1988: 116).

Swales' model has also been extended to the analysis of the RA Discussion section (e.g. Peng, 1987; Hopkins and Dudley-Evans, 1988; and Holmes, 1997) and dissertation Discussion section (Dudley-Evans, 1986), as well as the RA Results section (e.g. Brett, 1994). Adopting Swales' model, Skelton (1994), Nwogu (1997), and Posteguillo (1999) have developed a similar framework to analyse all the rhetorical divisions of the RA.

Despite the increasing interest in genre analysis, particularly in adopting and adapting Swales' CARS model, a number of challenging issues must be addressed and clarified in order to introduce a wider acceptance of the usefulness of the notion of *genre*. First, the notion of *register* was sacrificed and described as a field specific construct (Swales, 1990), and the notion of *genre* has been promoted as a cross-disciplinary construct, in order to meet pedagogical generalisations. Second, genre analysis studies, for example, Peng (1987), and Holmes (1997) have demonstrated that authors show inconsistent rhetorical generic preferences even within RAs of a single discipline. Third, most genre analysis studies have addressed the Introduction sections, and little attention has been

paid to the RA Methods and the Results sections. Likewise, only very few attempts have been made to examine all the rhetorical divisions of RAs belonging to a single discipline, as will be shown in Chapter 3. Fourth, earlier genre analysis studies can be criticised for methodological weaknesses. For example, genre analysts, like Swales (1981), excluded RA Introductions that do not contain reference to previous research. Likewise, Swales, (1981), Crookes (1986), and Najjar (1990) excluded theoretical RAs and those based on statistics or maths. This data exclusion may limit the generalisability of their pedagogical conclusions, due to the quantificatory nature of the theoretical RAs excluded. Fifth, no study has attempted a bottom-up and a top-down analysis of all the rhetorical sections of the RA across a variety of disciplines to find out how far a genre analysis model can be generalised as a cross-disciplinary model, distinct from register. Such an attempt is needed either to support or refute claims voiced by genre analysts such as Bhatia (1993) who called for the adoption of ‘a genre-based approach to assessment in ESP’. This approach would cut ‘across subject-matter differences so that it will no longer be necessary to devise textual material for each subject discipline’. Instead, he sought a shift in focus. This was postulated on the basis of recent research in genre analysis which indicates that ‘generic integrity is invariably maintained whether one writes a research article introduction in physical sciences or social sciences, or a report in technology or in business’ (p. 199).

Sixth, to the best of my knowledge, no study has gone further to investigate RA writers’ consciousness of the generic structures in the process of writing and to what extent generic structures are schematised by the producers of genre. Lastly, the bulk of the pedagogical implications of genre analysis research has remained focused on written texts as *products*, and little has been done to integrate findings of studies related to the RA writers’ schematic generic knowledge in the *process* of writing.

The primary purpose of this research project is to carry out a genre analysis of primary research articles across a variety of disciplines in English to discover their rhetorical organisation and to find out whether there are generalised generic models that can be shown to occur across different disciplines. This analysis will also be supplemented by another attempt to explore the schematic structure of the writers’ knowledge of the RA genre in terms of the moves constituting each RA section, a critically important yet largely unstudied area. In particular, the major questions this study will attempt to answer are:

1. Is the notion of register really a one dimensional field specific construct distinct from genre because of what it actually is or because of the way it was described? What sacrifice is made when genre-based models are dealt with as cutting across subject matter differences, put forward by genre analysts, such as Bhatia (1993: 199)?
2. How far can Swales (1990) and Bhatia's (1993) notion of generic models be generalised across disciplines, irrespective of register variations? If there are generalised generic models occurring across disciplines, how does each discipline bend these generic forms to meet its idiosyncratic specific needs? If the analysed RA texts selected from a variety of disciplines are found to exhibit significant organisational variations, where do the areas of difference lie and what are the reasons for these organisational variations?
3. Do writers have shared similar background knowledge of generic models and how far are they conscious of these models in the process of writing? How do writers actually structure the texts belonging to the same genre category in the process of writing?
4. What implications does our research project have for teaching genre writing and reading?

To answer the first research question, I provide a theoretical background context to demonstrate how far Swales (1990) was successful in tailoring the notion of genre in applied linguistics from literary, linguistic/sociolinguistic, and psycholinguistic resources. To provide an answer to the second research question, I carried out a cross-disciplinary RA genre 'move analysis' based on Swales (1990) and Bhatia (1993) to find out the constituent functional moves and sub-moves of each RA section and the lexico-grammatical exponents that are utilised to signal these moves. Sixteen RAs drawn from refereed and indexed journals covering a wide variety of disciplines were used for the genre text analysis. However, I will not look at the individual rhetorical organisational style of each RA in order to establish a generic model based on a single exemplar text selected from each discipline. Rather, the question is, if there are variations in rhetorical organisational styles across disciplines, how far the genre is controlling these styles, at least among the community of non-native speaker academics to which I have had access. For the third research question, I conducted semi-structured interviews with sixteen non-native RA writers whose RA texts were also subjected to analysis. I attempted to elicit information about the writers' schematic knowledge and to

cross-check how far genre writers are conscious of the generic models and resort to their schematic knowledge in the process of writing. Since the interviewees were the authors of the same RA texts used for the study, they were also used as specialist informants to give greater validity to my genre text analysis. This is not an uncommon method in ESP (Selinker, 1979; Tarone *et al.*, 1981; Huckin and Olsen, 1984; Bhatia, 1983; Pindi, 1988; and Dudley-Evans, 1994).

The dissertation will be organised as follows:

Chapter Two explores the origins of the notion of genre in literary, schema and linguistic/sociolinguistic theories to find out how these sources provide intellectual roots from which applied linguists fashion their generic models. It sheds some light on the relation between genre and register and how applied linguistic/sociolinguistic scholars have viewed this relation. Chapter Three provides an overview of the previous research that has explored the linguistic features and their rhetorical functions in the organisation of RA sections, as well as the rhetorical generic moves of each RA section (Introduction, Methods, Results and Discussion sections). This Chapter also highlights the shortcomings of the previous and current studies and indicates how the present research plans to overcome some of these weaknesses. The research methodology for conducting the semi-structured interviews with the RA writers to elicit the qualitative data and the linguistic genre analysis of the corpus texts selected will be presented in Chapter Four. Chapter Five focuses on the cross-disciplinary generic move analysis of the four RA formal sections (Introduction, Methods, Results, and Discussion). The results of the analysis of the constituent moves and steps and the linguistic exponents used by the RA writers to signal these moves pertinent to each RA formal division are presented in separate sections. Each section concludes with a discussion of the cross-disciplinary move structure variations and the possible reasons for these variations. Chapter Six presents the results of the qualitative data analysis. In particular, this Chapter examines the writers' schematic knowledge of the RA genre, their composing strategies and their comments on what our genre text analysis suggests. Chapter Seven summarises the findings of the study and proposes some potential theoretical suggestions and pedagogical implications for the teaching of genre writing and reading. Then, the Chapter concludes with the limitations of the present study and offers some recommendations for further research.

2. Theoretical Framework

2.0. Introduction

The notion of *genre* is at the root of a wave of theories and studies in a range of disciplines. Genre appears to have various interpretations depending on the kind of orientation the researcher brings into the analysis, whether literary, linguistic, sociological or psychological.

In this chapter, I wish to show how the notion of genre has been used in the aforementioned fields and how researchers in applied linguistics have drawn upon this construct to outline various frameworks of genre analysis. In particular, the following theoretical framework attempts to clarify how ESP Teachers have succeeded in fashioning the concept of ESP genre from literary, psychological, social and linguistic resources and what sacrifices were made to meet their pedagogical objectives.

The purpose of this chapter is threefold: First, I will consider the notion of genre in literature in order to find out how far the generic frameworks of analysis for non-literary works have been influenced by literary roots. Second, I will explore how far the literary, linguistic/sociolinguistic and psychological resources contribute to form the notion of genre and to what extent Swales (1990), in *Genre Analysis*, which is one of the seminal works for ESP, has succeeded in fashioning this concept to meet the pedagogical demands of genre. Third, I will attempt to clarify the confusion regarding the conflated relation between the notion of genre and *register*.

The review begins by outlining the notion of genre in literary works. Then linguistic/sociolinguistic studies of particular aspects of the genre/register relationship will be surveyed to determine where this conflated relationship lies and whether this relation is complementary or divisive. Finally, schematic perspectives of genre will also be presented and discussed.

2.1. Genre in Literature

As pointed out by Swales (1990), the notion of 'genre' has its roots in literary studies where it maintains a central position. The word 'genre' comes from the Latin word 'genus' which means 'kind' or 'type'. Todorov (1973: 1) maintains that 'when we examine works of literature from the perspective of genre, ... we discover a principal operative in a number of texts, rather than what is specific about each of them'.

Genre is rooted in classical sources where it was used to refer to literary types such as 'ballads, odes, sonnets, tragedies and comedies' (ibid. 1990: 13). Dubrow (1982: 46-48) points out that the name most associated with this concept is Aristotle who presented a commentary on genre. For Aristotle, distinguishing between genres is primarily a matter of narrative use. The first person is used in epic. In lyrics, the narrator speaks in the first person, then lets characters speak for themselves, while in drama the characters do all the talking.

On the other hand, Russian formalists de-emphasise the established conventional patterns in literary works. According to Shklovsky, a Russian formalist, the function of art is to make people aware of the world in a fresh way. This device is called 'defamiliarisation', or making strange (Lemon and Reis, 1965). The task of the author, in Shklovsky's view, is to cut the familiar events out of their habitual context and present them in a new mould as if they were seen for the first time. The formalists argue that the violation of the norms of genre is not arbitrary but it has a function to serve; that is to make readers experience the world in a new and fresh way.

As a structuralist critic, Todorov (1976, 1990) has defended the idea of genre against those literary writers who write in deliberate violation of its conventions and treat them as obsolete. According to his view, a genre represents a mould. This mould is needed to calibrate the deviation of a literary text from the norms. Todorov (1973) emphasises the need for the genre in the sense that a literary work is not only compared to its genre but it is also compared to other literary works to find out to what extent it is distinct or similar to them. If they are distinct, both of these works are looked at and compared in the light of the 'lay-point', the genre, to which the pieces of writings are assumed to correspond. Thus, genre stands as a source of reference or a prototype for both the writer who produces the text and the reader who receives it.

Additionally, genre offers a positive support for writers. Fowler (1982) argues, 'Far from inhibiting the author, genres are a positive support. They offer room ... for him to

write in - a habitation of mediated definiteness; a proportioned mental space; a literary matrix by which to order his experience during composition' (ibid: 31).

In connection with identifying and differentiating between types of genre, Fowler (ibid: 60) points out that 'every kind is characterized by an *external structure*... whether by physical division into chapters, stanzas, and the like, or by conventional organization of the contents'. A sonnet, for instance, has fourteen lines and follows certain stanzaic and rhyme patterns such as Shakespearean or Petrarchian. It follows that any literary genre will draw on certain organisational conventions that differentiate it from other genres.

Jolliffe (1996: 279) sees the formula for identifying genre as 'usually *class plus differentia*, with the differentia generally comprising characteristics of either subject matter or form'. For Jolliffe (ibid: 180), the definition of genre is not only a matter of classifying texts on the bases of either form or content: 'Genre instead is a cognitive construction, a coding template that leads to active, often purposeful, reading and writing'.

It is worthwhile noting that genre awareness is crucial for readers as well as for writers. For the reader of literary texts, genre functions as a framework for a text's intelligibility. In order to comprehend a text, the reader is to locate it within a context. The importance of a genre for the reader to understand a literary text is not less than that of a context to a text. Culler (1975) maintains that generic norms provide expectations for the reader to guide him in his encounter with the text-genre. To meet the reader's expectations, an effective writer is supposed to foreground the generic features of the text which in turn cause the activation of the preconceptions or presuppositions of the similar genre the text encountered belongs to. For instance, reading something as comedy involves expectations on the part of the reader different from reading something as a tragedy or a tragi-comedy.

An additional point is that a literary genre shapes and is shaped by the ideology of the society. For example, Todorov (1990) explains that

'a society chooses and codifies the acts that correspond most closely to its ideology; that is why the existence of certain genres in one society, their absence in another, are revelatory of that ideology and allow us to establish it more or less completely. It is not a coincidence that the epic is possible in one period, the novel in another, with the individual hero of the novel opposed to the collective hero of the epic: each of these choices depends upon the ideological framework within which it operates' (p. 19).

Thus, genre is seen as a response to the social situations as well as a mirror of the socio-cultural attitudes in the sense that they constitute a sort of underlying stratum, inextricably interwoven with the texture of the genre.

Typical of this social function of genre is its reflection of perception as to class structure. The following quote from Dubrow (1982: 60) illustrates this: 'classical rhetoricians frequently expound the principal that tragedy concerns men of high estate and comedy characters of a lower class'.

Equally important is the reader's knowledge of the historical development of the genre. Hepburn (1983) stresses this point, saying:

'How a competent reader approaches a work of literature, his attitudes and expectations, depend importantly upon the genre he sees it as exemplifying. A work that rebels against genre-conventions equally relies on the reader's recognition of the conventions being rejected. Aesthetically relevant features of a work may stand out only if its reader has a background awareness of the historical development of the genre, or of the style, that the work is transforming in its distinctive way and perhaps without direct allusion within the text itself. The work may demand to be seen against the foil of the whole tradition from which it stems, and which it modifies by its very existence' (p. 496).

An explanation of how genres emerge can be found in the work of Todorov (1990). He points out that a new genre evolves 'quite simply from other genres. A new genre is always the transformation of an earlier one, or of several: by inversion, by displacement, by combination' (p.15).

Other authors have gone further to draw an analogy between linguistic competence and generic competence, seeing the latter as the writer's repository of generic resources from which other actual genre exemplars could be derived. Barton (1984) and Gerhart (1988) argue that generic competence is analogous to linguistic competence. For example, Gerhart (1988) claims that 'By analogy, we may say that generic competence designates a potential of human beings for understanding presently existing and future possible texts, given that such texts are structured according to specifiable generic [sic] principals' (ibid: 32).

Concerning the generative metaphor, one might argue that the picture of the analogy between linguistic competence and generic competence is attractive because it fosters the notion of the productive form. However, when we consider the real bases of the analogy, this argument does not work. In other words, genre competence is not as generative (i.e. fully specified) as linguistic competence. Transformational grammar reflects through a system of specific set of rules the knowledge which the native speaker

uses in forming grammatical sentences. Thus these rules are finite and have a formal existence.

By contrast, in the case of genre competence, the issue is different for the mere reason that we concentrate on what language means. Imposing finite generic patterns is a restriction on what can be said because a writer prefers a number of choices as to content. Thus, this is more a case of metaphorical transfer (Al Ali and Holme, 1999). Since we are in the domain of content and meaning, we cannot impose definite restrictions on what is said. In other words, it is difficult to propose specific rules through which one can generate generic patterns. There are no specific rules to identify why the patterns of a particular genre are in a particular form and order and not in another, apart from what people believe what these generic patterns mean. The audience's views may vary with respect to what things mean. This is because although genres are repeatable, it is difficult to encounter absolutely identical texts belonging to the same genre due to the fact that the purposes and the contextual variables are not always the same. Additionally, generic patterns are often subject to violation or change by other offspring genres.

The difference becomes apparent when Swales (1990) considers that a particular genre is rationalised by its communicative purpose, and that 'this rationale shapes the schematic structure of the discourse' (p. 58). This means that we start with the communicative purpose first, then we proceed to the stages through which the purpose is articulated. In other words the stages or the moves of the genre are just vehicles of the communicative purposes. Since we look at the stages of a genre from a purposeful perspective, this implies that we are interested in what these stages mean, and this in turn moves us away from the formal perspective on which linguistic competence is based.

On the other hand, Dubrow (1982: 106) criticised those who compared the genre system to Saussurean's *langue*, that literary works are constructed and interpreted in relation to the system of genre as actual linguistic performances are constructed and interpreted in relation to the rules of language. For example, Fowler (1982) argues that the literary *langue*

'supplies the deficiency of actual situation in two main ways. First, it provides a situation of *literary* context; second, it reinforces the signal system with additional coding rules... Of all the codes of literary *langue*, I have no hesitation in proposing genre as the most important' (p. 22).

Throughout the above survey of the literary genre, we realised that a literary text is not an island, rather, each text belongs to another group of texts, having shared characteristics, which in turn form a genre. These characteristics have been thought of differently and looked at from various perspectives. The literary critics have adopted various criteria for the characterisation of these literary types such as classifications according to the point of view from which narration is presented, the rhetorical organisation, the topic and theme. Another point worth mentioning before closing this section is the idea that generic conventions are always refined, modified, developed, and sometimes undermined or changed so as to accommodate the attitudes of the social context.

Such an account of scholarship of genre in literature signposts how far the generic frameworks of analysis of literary perspective provide intellectual roots for non-literary works to draw from. For example, as will be pointed out later, seminal to ESP practitioners was Todorov's idea of the importance of generic models as a source of reference for both the reader and writer. That is to say, these models foreground the generic features to be instantiated (Swales, 1990) when similar genre exemplars are encountered. Similarly, the ESP framework of analysis seems to be influenced by the generative metaphor of genre indicated by Barton (1984) and Gerhart (1988). Additionally, the notion of genre in literature is influenced by the ideology and the social conventions and thus is refashioned by them. This in turn gives inspirational ideas to systemic linguists, as will be pointed out throughout this Chapter. Their view of genre held by Martin (1985) and others bears resemblance to the literary view of how genre relates to ideology and social conventions.

2.2. Genre and Register Relationship in Linguistic/Sociolinguistic Studies

Swales (1990: 2-3) put forward a genre-based and cross-registeral approach of teaching writing based on genre analysis as opposed to the earlier version of quantitative register analysis. The latter version was described as an outmoded approach concerned with correlating a particular variety of language with particular linguistic exponents devoid of contextual features, such as communicative purpose, interpersonal relationships and genre conventions.

Motivated by pedagogical objectives, Swales' cross-disciplinary approach appears to have a powerful pedagogical value for English for Academic Purposes (EAP) against a subject or field specific ESP register analysis. Genre is posited as a socio-linguistic construct through which the communicative purposes of the discourse community are articulated. To emphasise the role of purposeful social processes in shaping genre structure, Swales provides the following definition of 'genre':

'A genre comprises a class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community, and thereby constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains choice of content and style' (Swales, 1990: 58).

The implication of a genre-based approach, according to Swales' view, resides in helping non-native speakers master models of generic rhetorical structures together with the linguistic exponents used by the writers to realise these move structures.

Swales' approach gives rise to the following questions or difficulties: Is register analysis really inadequate in comparison to genre analysis as some genre analysts claim? Is register distinct from genre because of what register really is or because of how it was analysed?

In response to the questions, I will try to investigate what the relation between genre and register is, and how this relation has been viewed by different linguistic and sociolinguistic scholars. I will also try to shed some light on the nature of the relationship between schema theory and the notion of genre. Understanding all of the currents in the present area of study also requires investigation of the origins of the concomitant relationship between genre and register in linguistics and socio-linguistics and a demonstration of why and where this conflated relation resides. To provide tentative answers to the above questions, it is worth examining Swales' ideas of genre analysis in relation to other areas such as formal register analysis represented by Barber (1962); Halliday *et. al.* (1964); and Swales (1971) and the systemicists notion of genre and register analysis.

2.2.1. The Development of the Notions of Genre and Register in Linguistic/Socio-linguistic Traditions

The notions of register and genre have been approached differently by various scholars, putting forward different terminology to distinguish the constituent values of these

notions. However, the notion of register has been more predominantly used, even to the extent that the notion of genre became a constituent variable of 'register'. In what follows, I will try to shed some light on this register- genre- social context conditioned relation.

Ellis and Ure (1969) point out that Reid (1956) was the first to put forward the notion of 'register'.

'For the linguistic behaviour of a given individual is by no means uniform; placed in what appear to be linguistically identical conditions, he will on different occasions speak (or write) differently according to what may be roughly described as different social situations: he will use a number of distinct 'registers'', quoted in Meetham and Hudson (1969: 251).

The terminologies describing the constituent values of register mainly come to aggregate around the following aspects, namely, 'field' 'mode' and 'style', quoted in Meetham and Hudson (1969). After Reid (1956), Hill (1958) independently put forward an alternative terminology: 'style, 'genre', and 'mode'.

Strang (1962) distinguished register in a narrower sense: according to him, 'register' is equivalent to the field of discourse.

The term 'register', according to Halliday *et al.* (1964), 'may be distinguished according to field of discourse, mode of discourse, style of discourse' (p. 90). In their view, register is used to cover a specific use of language in a particular situation. In this context, they mention that 'the category of register is needed when we want to account for what people do with their language. When we observe language variety in various contexts we feel differences in the type of language selected as appropriate to different types of situations' (1964: 87).

Catford (1965) employed the term 'register' to correspond to the field of discourse. Gregory (1967) added another category to Halliday *et al.*'s three dimensional register, termed as the 'function of discourse'.

On the other hand, Crystal and Davy (1969) criticised Halliday *et al.* (1964) in correlating recurrent linguistic features to the situation in which they happen to occur. Their criticism is based on the proposition that the majority of the linguistic features have little predictive power. They pointed out that 'it may, of course, be convenient to posit a one-for-one correlation between a set of linguistic forms and a situation, but

while this relation does sometimes genuinely exist, it would be a mistake to assume that it always exists, and to talk rigidly in terms of 'one language - one situation' (p. 63).

Furthermore, they drew attention to the distinction between genre and register, as well as to the distinction between genres themselves. According to their view, genre is associated with 'modality', whereas, register is related to 'province'. The specific purpose (i.e. modality) dictates the suitability of genre to be utilised. Crystal and Davy pointed out that

'The familiar distinction between "genres"... could also be seen in terms of modality,... [The term genre] is regularly used to refer simultaneously to varieties operating at different degrees of theoretical abstraction - for example, "poetry" v "prose", as well as "essay" v "short story", which are sub-categories of prose' (p. 75).

Added to the view that the modality determines the suitability of genre format, the authors further argue that 'Modality differences may both cut across provinces- it is possible to have a commentary about sport or cooking or even a scientific experiment, for example- and also occur within them' (ibid: 75). A province in the authors' (ibid.) view may contain various modalities (e.g. legal English, literary English).

Hymes (1964: 23) identified 'the forms of messages, and their genres... [and] the events themselves, their kinds and characters as wholes'. The first feature refers to what form is intended (e.g. a tale, a letter, a sonnet *etc.*). The 'event', on the other hand, refers to the nature of the communicative event a genre is part of (Brown and Yule, 1983: 38), i.e. a 'lead article' may be a part of the 'article', as a communicative event. Furthermore, Hymes distinguished genres and sub-genres. The former includes written genres such as tale, poem, myth, editorial and letter, whereas sermons and hymns are considered as sub-genres of church service genre.

On the other hand, Widdowson proposes 'rhetoric' as a basis for identifying registers instead of the three dimensions, field, mode, and style. He argues that:

'Perhaps the only way of characterising different language registers is to discover what rhetorical acts are commonly performed in them, how they combine to form composite communication units and what linguistic devices are used to indicate them' (1979:16).

Consideration of the relationship between genre and register concepts in linguistic/ socio-linguistic writings gives rise to the following points of concern: First, Hill (1958) was the first to propose the suggested dimension 'genre', followed by Hymes (1964). Second, a field (province) may have various communicative purposes (i.e. modalities)

articulated throughout various genres that in turn cut across field variations (Crystal and Davy, 1969). Third, it will perhaps have been noticed that the notion of genre was subsumed as a constituent component of the notion register (e.g. Hill, 1958). Fourth, the term 'register' was used by researchers such as Strang (1962) and Catford (1965) as equivalent to the 'field of discourse'. We may argue that, as a consequence, the term 'register' and the 'field of discourse' seem to have been conflated in a number of studies. For example, the term 'register' was used to correspond only to the 'field of discourse' or the 'subject matter' (Spencer and Gregory, 1964: 87). This argument is supported by Robinson (1991: 20) who points out that 'the overall term, register, is sometimes also used for the component 'field''. The problem with register being used as an equivalent only to 'field' is that it led some researchers in the field of register analysis to operate on

'the basic principal that the English of, say, Electrical Engineering constituted a specific register different from that of, say, Biology or of General English, the aim of the analysis was to identify the grammatical and lexical features of these registers' (Hutchinson and Waters, 1987: 9-10).

These identified lexico-grammatical features are referred to 'as a discrete set of linguistic choices, seen as quite separate from the rest of the language. Thus we find... 'the language of science', 'the language of medicine'' (Robinson 1991: 20). On the other hand, Hatim (1990) maintains that 'there is general agreement that *field is not the same as subject matter...we encounter fields that are characterised by a variety of subject matters* (e.g. political discourse as a field may be about law and order, taxation or foreign policy)' (p. 48).

2.2.2. Register Analysis

Our review so far has revealed that the term 'register' was not used in the early works of linguists and that it was first used by Reid (1956). The notion of register analysis was introduced first in the context of English for specific purposes. It was represented mainly in the works of Barber (1962), Halliday *et al.* (1964) and Swales (1971).

Register analysis involves determining the formal characteristics of various registers (varieties) by identifying and counting the occurrence/non-occurrence of the grammatical and the lexical features associated with a specific field (such as medical English, scientific English, legal English, business English, etc.) in a particular register. It operates on the assumption that each register has its own characteristic features that

differentiate it from other varieties of English, on the one hand, and common-core English, on the other.

Motivated by pedagogical objectives, ESP researchers tried to make use of this notion so as to provide the teachers with a syllabus for teaching. Researchers in that decade were influenced by the structural approach, which was the prevalent during that time (Swales, 1988), and subsequently by the orientation towards generative grammar. The structuralists' focus was mainly on the analysis of decontextualised sentence grammar to provide a description of the language units such as phonemes, morphemes, nouns, verbs, *etc.* Thus, they had phoneme and morpheme systems but there was no register system because this category was beyond the sentence level. As a way out, during that decade, researchers such as Barber (1962) analysed 'register' (a text selected from a particular subject area) into its constituent sentences and clauses. These clauses were also analysed into their lexico-grammatical features. The linguistic components of the constituent sentences of a register were dealt with as decontextualised products. Illustrative examples of sentence analysis are studies carried out by Barber (1962), and Huddleston (1971).

We may argue that two traditions of register analysis studies have concomitantly developed but in two different directions. They are the ESP register analysis, and the Hallidayan register analysis. These traditions remained attached and encompassed under the notion of 'register'.

The first trend was represented by 'register analysis' carried out by ESP practitioners and was mainly restricted to the 'field' or 'subject area'. This approach was confined to the analysis of texts within a subject area but not contextualised by interpersonal or textual relations, whereas the second trend, the Hallidayan perspective of register, has emphasised text - context relationship and continued to be represented by the triangular configuration of the contextual variables of 'field', 'mode' and 'tenor'. The latter tradition has continued to emphasise the idea that any description of discourse should take into account these three contextual registeral values.

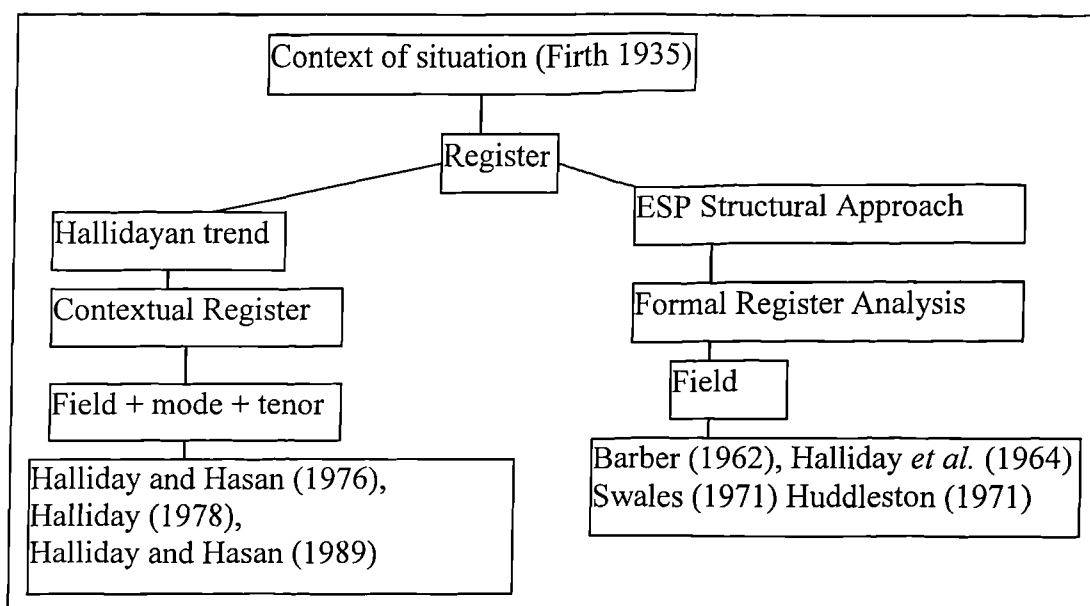


Figure 2.1 Two paths of register analysis

2.2.2.1. ESP Register Analysis

ESP Register analysis 'refers to the counting of lexis and grammatical forms in particular registers (i.e. the scientific or mathematical register)' (Dudley-Evans, 1987: 4). This path came to prioritise the monolithic value of the 'field' of discourse at the expense of the other two contextual values 'mode' and 'tenor'. Barber (1962), Ewer and Latorre (1969), Swales (1971) and Huddleston (1971) attempted to provide a systematic description of the finite range of the linguistic exponents which differentiate a single variety from other varieties of English. The above researchers considered the notion of specific grammar, which is specific to a subject area, from the point of view of 'form'.

Regardless of the field investigated, ESP register analysis studies (Barber, 1962; Huddleston, 1971; Turner, 1973; Corder, 1973; Chui, 1973; Trudgill, 1974; Sager *et al.*, 1980; Longue, 1985; etc.) during the seventies and eighties had the common goal of verifying the hypothesis that each language variety has distinctive linguistic components which differentiate it from common-core English and other language varieties.

However, there has been a gradual shift towards a description of the form - function correlation. A drift from register analysis concerned mainly with 'usage' towards an analysis basing itself mainly on rhetorical consideration interested in the 'use' of language in social communication has its roots in the works of Lackstrom *et al.* (1972) and Allen and Widdowson (1974). The former authors emphasise the role of the

communicative purposes of the writers in determining the rhetorical choices and text organisation. They further attempt to show that tense choice, for example, may be determined by the rhetorical functions of the sections of the 'report' in which that particular tense occurs rather than by a grammatical choice based on time. In their view, a verb tense is not chosen on the basis of when the event took place but rather on the basis of the author's communicative purpose. For instance, how widespread the author believes the supporting evidence in the various sections of a genre, such as a 'report', determines the choice of tense: 'If he has knowledge of a large number of cases he will use the present tense. If he knows of fewer cases, he will use the present perfect. If he knows of only one case, the past tense will be used' (Lackstrom, *et al.* 1972: 65).

It is quite obvious that Lackstrom *et al.* emphasise the idea that the rhetorical order of the presentation of information within a text is goal - oriented; it is based on the writer's intention.

Likewise in their seminal (1974) paper, Allen and Widdowson point out that

'the acquisition of receptive and productive knowledge of a language must involve the learning of rules of use as well as rules of grammar... What we have attempted to do is to show how rules of use might be taught, both those which have to do with the communicative properties of discourse and those which have to do with the formal properties of the texts' (p. 86).

Although the authors advocate a departure towards 'use', one feels a sense of prescription in their recommendation of teaching and learning the 'rules of use' and grammar. An emphasis is put on the rhetorical organisation of the text type as purposive and goal-oriented, rather than on purely decontextualised sentences constituting that text. That is to say, there is a gradual departure from register analysis focusing on the decontextualised intrasentential level towards intersentential and interparagraph analysis level, i.e. discourse level.

A careful examination of the literature presented, as well as other works not cited here, reflects the considerable changes in the field of register analysis in the last few decades. We realise that there has been a drift from formal surface description to form-function correlation.

2.2.2.2. Hallidayan Register Analysis

In the previous section, it has been shown that 'register analysis' has been used in a very narrow sense by the ESP practitioners. It has been restricted to only one variable of 'register' (i.e. the field of discourse) as opposed to Halliday's notion of register as a contextual configuration of the three variables (field, mode and tenor). As is shown in Figure 2.1 above, systemic linguistics drew mainly from the text- context conditioned relationship laid down by Firth (1935). Although Halliday *et al.* (1964) maintained that 'if two samples of language activity from what, on non-linguistic grounds, could be considered different situation-types show no differences in grammar or lexis, they are assigned to one and the same register' (ibid. 1964: 89), the later Hallidayan literature drifted towards '*which* kinds of situational factor determine *which* kinds of selection in the linguistic system?' (ibid. 1978: 32).

Unlike the earlier traditions of ESP register analysts, who downgraded the contextual configurations of register values, Halliday (1978) has continued to prioritise the abstract components of a communicative situational context, 'field', 'mode', and 'tenor' together with the lexico-grammatical exponents used to realise these contextual variables of situation. According to his view, any register analysis should account for the functions which are determined by 'what is usually taking place; secondly, who is taking part; and thirdly, what part of the language is playing' (ibid: 31), and the language exponents used to express the three variables.

2.2.3. Genre Analysis

At the opening of this chapter, we have presented the role and function of genre in literary works. According to Ventola (1989: 129), '*systemic-functional linguistics* extends the term genre from its general literary meaning to the classification of *social interactions* or *social processes* into types'. Thus, the term 'genre' is used to refer to any identifiable type of discourse (Traugott and Pratt, 1980). Viewed as a discourse type, the notion of genre analysis is developed in the context of discourse analysis because it operates with units larger than a sentence. In introducing genre analysis, it is worth relating this area to discourse analysis.

Discourse analysis deals with clause relations and aspects of language beyond the sentence level; it operates across texts. It seeks to describe how the context of the text affects and reflects its subject matter, target audience and texture. The meaning of the

text is interpreted with reference to its contextual features (Brown and Yule 1983). Discourse analysis conveys how different meanings are created due to different structuring of the text, the role relationship between the participants, the topic being talked about and the purpose of the communicators. However, in Dudley-Evans' (1987, and 1989) view, Winter (1974) and Hoey (1983) seek 'to describe relations that are found in all texts. [Discourse analysis] is concerned with the similarities between texts' (p. 5). Winter and Hoey suggest discourse patterns to be taught to students, such as Problem-Solution patterns, and General- Particular patterns etc. and that are found in all texts. However such a system of analysis does not say anything about individual text types and does not indicate 'how each type of text differs from other types' (Dudley-Evans 1989: 73).

More recently, most of the systemic linguists following Halliday and ESP practitioners following Swales have overemphasised the notion of genre to the extent that it has been recognised as equivalent to register and sometimes has been over privileged and considered more effective in *accounting for social and cultural factors in language use* than 'register'. In the following two sub-sections, I will consider how the notion of genre has come to be used in the above-mentioned two traditions.

2.2.3.1. Systemic Linguistics Concept of Genre Analysis

In this sub-section, we present two related genre approaches within the school of systemic linguistics; namely, Halliday and Hasan's view of genre organisation, and that of Martin and colleagues, who base their notion of genre on the groundwork laid by Halliday.

2.2.3.1.1. Systemic Linguistics (Halliday and Hasan)

Halliday (1978) and Halliday and Hasan (1989) have continued to recognise register as subsuming the notion of genre. For example, 'the concept of genre [...] is an aspect of what we call here the 'mode'' (Halliday, 1978: 145). Genre operates in conjunction with the other two linguistic factors 'texture' and 'cohesion' within the register framework to distinguish a text from non-text. Thus, it is calibration of these three factors that works to differentiate complete text from incomplete text (Halliday and Hasan, 1989: 109-110).

Only recently has the term 'genre' been dealt with in the systemic school. In systemic functional linguistics, Hasan (1977) and Halliday and Hasan (1989) introduce the term 'contextual configuration', using the acronym CC, to refer to the constituent values of register (field, mode and tenor). 'A CC is a specific set of values that realises field, tenor, and mode' (Halliday and Hasan, 1989: 55) and 'genre is the verbal expression of a CC [contextual configuration]' (ibid: 110). The contextual configuration of a social situation, according to Hasan's view, gives rise to functional elements to be realised in the discourse, and determines the functional similarity of texts belonging to the same genre (Hasan, 1977: 229). This means, according to the author's view, that the different functions of a text are realised in the structuring of the discourse. Furthermore, when the contextual configuration is the same in a number of social events and the obligatory elements of their textual structures are kept constant, it is presumed that the texts will resemble one another functionally and in the way they are structured and realised linguistically.

Her proposed 'generic structure potential' (GSP) is meant to refer to 'the total range of optional and obligatory elements and their order' (Halliday and Hasan, 1989: 64) available within genre. Each genre has its own GSP, which is a result of particular field, mode and tenor combination. The authors' GSP model (ibid: 59- 69) specifies the following criteria for defining a genre in texts with a particular contextual configuration:

- 1- obligatory elements,
- 2- optional elements, and
- 3- permissible sequence and reiteration of elements.

However, the two terms, register and genre, appear to be used interchangeably, and some times the authors (ibid.) seem to equate genre with register as it appears in the following example, 'the features, the factors, which allow us to judge whether or not a text is complete are essentially the same features that also allow us to identify its register, i.e. genre' (ibid: 109- 110).

Hasan's GSP is not without problems. The first problem has to do with some confusion that emerges because of the interchangeable use of 'genre' and 'register'. For example, Halliday and Hasan (1980: 78) use the terms '... a genre or register', and '... register, i.e. genre' (ibid.1989: 110). It seems therefore that they use either of these two terms to have the same meaning. Littlefair (1991: 83) reinforces this saying that the variation between these two notions is also unclear, and that Halliday and Hasan use them as 'synonymous terms'.

Other problems have been examined and discussed in Ventola (1987). Ventola attempted to apply GSP on a corpus of service encounters, post office, small shop and travel agency texts on the assumption that the context of situation of these texts is the same as that of 'greengrocers' analysed by Hasan (1977). Ventola (ibid.) encountered the following problems. Firstly, the criteria of the 'obligatory elements' and the 'permissible sequence' of the GSP rules constrain the possibility of realising one obligatory element before the other. Changing the sequence of the obligatory elements may also result in a different genre. The second difficulty is brought about when Ventola (1987) could not capture what texts of service encounter have in common although their context of situation is similar, apart from some change in 'field'. According to Hasan's model, these texts do not have a uniformity of genre because they either violate the sequential order of the obligatory rules or do not fulfil any of the obligatory stated elements. The final problem with Hasan's model, for Ventola, is that it cannot account for the non-verbal realisation of activities.

As an alternative, Ventola (1987) adopts the 'flowchart' as a dynamic model to represent the uniformity of genre in the three texts, and to show the various possibilities of realising the seemingly different texts. The flowchart model reveals that interactants do not go through the social process in the same way because the elements of the social process are negotiated by the interactants. Some of these elements may reoccur, and others may be left out. Therefore this model represents a dynamic system capable of handling the above-mentioned problems encountered in the GSP model.

2.2.3.1.2. Systemic Linguistics (Martin and Colleagues)

On the other hand, the second sub-tradition of the systemics is represented by Martin and his colleagues who have considered genre and register as two separate concepts. Martin, Christie and Rothery (1987: 59) indicate that 'Genre theory differs from register theory in the amount of emphasis it places on social purpose as a determining variable in language use'. According to Martin (1985), genre is a notion subsuming register. Genre is realised by 'register', which is in turn realised by language.

Although Martin and his colleagues base their work on the Hallidayan view, these systemic linguists have developed a wider socio-cultural perspective of genre.

For Martin (1985),

‘Genres are how things get done, when language is used to accomplish them. They range from literary to far from literary forms: poems, narratives, expositions, lectures, seminars, recipes, manuals, appointment making, service encounters, news broadcasts and so on. The term genre is used here to embrace each of the linguistically realized activity types which comprise so much of our culture’ (p. 250).

Most of the Australian genre scholars follow Halliday in focusing much more on the purpose of the social interaction and the succession of the stages the participants go into to attain the purpose of the interaction. For example, Martin and Christie view genre as ‘a staged, goal-oriented, purposeful activity in which speakers engage as members of our culture’ (1984: 25). Martin, Christie and Rothery (1987) define genre in a similar way. For Green (1987) ‘genre is to be seen as a staged, purposive or goal-oriented cultural activity; a meaningful form of social action’ (p. 86).

Ventola (1987: 1) describes social interactions as ‘social processes, which realize the social activity, unfold in stages and, in doing so, achieve a certain goal or purpose’. She further explains that each interaction is described as a chain which stands for the overall purpose of the social interaction, and each chain consists of several links each of which has a minor function in the whole chain. ‘By carrying out their individual functions, the elements of the chain achieve the overall global function’ (ibid: 1).

Defining genre in this way, we recognise that a given social activity has certain purposes. To fulfil the goals of this purposeful activity, the participants have to go through certain steps. Each purpose is articulated through a certain step. Since this activity is staged, it is anticipated that these stages are executed in order. A further aspect of this definition is the fact that a genre is a recognised socio-cultural form, in the sense that members of a specific culture are involved in social interactions in order to accomplish their objectives. The recurrence of these social interactions gives rise to the communicative events that are considered characteristic of the social interaction. The resultant repeated social interactions are then articulated by genre. Therefore, Martin attempts to emphasise the role of goal-oriented social activities in shaping the genre structure. Because of this definition, ‘genre’ has become separated from and assigned supremacy over the concept of register (Martin, 1985).

Based on the tradition of systemic functional linguistics, particularly on Martin’s views, Eggins (1994) tries to tackle how people use genre to achieve culturally appropriate goals. Eggins says that in discussing any text, an analyst has to refer to two types of

contexts; an immediate context, the context of situation, which is characterised in terms of three variables: field, mode and tenor; and to a general context, the context of culture which constrains the possible combination of the variables of the context of situation. In describing the latter context, the analyst is supposed to relate the text to the cultural context, and to investigate how the purposes of the social activity are realised through the particular stages that the interlocutors go through. The purposes of the social activity have meaning in relation to their cultural context. In turn, these culturally staged, purposeful, goal oriented activities are brought into existence through language, but 'this process of realizing genres in language is mediated through the realization of register' (Eggins, 1994: 34).

In line with Martin's focus on the role of social conventions and the effect of cultural constraints on text production, Kress focuses on the social process and practices and their functions in yielding various generic forms. In what follows, Kress (1989:19) reveals the effect of sociolinguistic factors on the texture and structure of genre:

'The social occasions of which texts are a part have a fundamentally important effect on texts. The characteristic features and structures of those situations, the purposes of the participants, the goals of the participants all have their effects on the form of the texts which are constructed in those situations. The situations are always conventional. That is, the occasions on which we interact, the social relations which we contact, are conventionalised and structured, more or less thoroughly, depending on the kind of situation it is. They range from entirely formulaic and ritualised occasions, such as royal weddings, sporting encounters, committee meetings... The structures and forms of the conventionalised occasions themselves signify the functions, the purposes of the participants, and the desired goals of the occasion.'

According to Kress (1987: 36) 'Genre is the term which describes that aspect of the form of texts which is due to the effect of their production in particular social occasions'.

However, unlike Martin who focuses on the importance of the purpose of the participants and the sequential stages interlocutors go into to articulate their goals, for Kress (1993), 'genre' is a term for only a part of textual structuring, namely the part which has to do with the structuring effect on text of sets of complex social relations between consumers and producers of texts' (p. 33). Moreover, it is worthwhile mentioning that the relation between genre and register is perceived differently by Kress. He recognises genre as 'one term which, together with others, forms the complex which constitutes significantly different types of text; to which I am happy to give the

label ‘register’ (ibid: 35). However, for Martin (1985: 249), genre is stacked up against register and register in turn is stacked against language.

As we have seen above, of great importance to Australian genre theorists is the function of cultural dimensions and the social structures, conventions and interactions that go in the structural formation and production of the text. Thus, this socio-cultural approach gives rise to pedagogical practices represented by ‘the Martin/Rothery curriculum cycle attempts to engage students in an awareness of the social purposes, text structure and language features in a range of identified text types or genres’ (Callaghan *et al.*, 1993: 180). Cope and Kalantzis (1993) point out that Martin's model of genre involves engaging students in three stages or phases. In the first phase students are exposed to models of genre where the teacher draws the students’ attention to the significant features of genre such as the social purpose, the stages and the linguistic exponents. In the following phase, joint negotiation of a text, students prepare information on the field and the context of genre to be constructed followed by negotiating the construction of the generic text with the teacher. ‘The teacher acts as a scribe as the students contribute to a jointly constructed text which approximates the schematic structure of report genre’ (ibid: 10). The final stage involves independent construction of the text.

Martin emphasises the importance of teaching the meanings and functions of each stage of genre in context so that these staged generic features, when mastered, can be instantiated when students encounter similar texts. Such a teaching model shares a few similarities with Swales’ teaching of generic models, which will be addressed in the following section, in that both of these approaches attempt to make the structuring features of the generic models explicit so that students can replicate similar exemplars.

2.2.3.2. ESP Concept of Genre Analysis

Genre analysis as proposed by Swales (1981, 1987, 1988, and 1990) and Bhatia (1993) is a system of analysis that attempts to reveal the organisational structural patterns for various academic and professional genres and how these patterns are realised lexico-grammatically.

We have noticed elsewhere in this chapter how ESP practitioners fashioned the earlier notion of register so as to create a space for it in the domain of the structural approach, due to the fact that there was no system of analysis equivalent to ‘register’. Being influenced by the structural approach and motivated by pedagogical needs, those researchers reduced the Firthian contextualised notion of social activity into

decontextualised texts perceived as strings of sentences devoid of context. Texts extracted from various fields of discourse were analysed into their formal characteristic features by identifying and counting the frequency of lexico-grammatical features occurring in each particular register so as to design syllabuses based on these formal features described.

Motivated by teaching purposes, Swales (1981) has argued against those who have emphasised the formal linguistic features devoid of context. In order to come up with pedagogical generalisations, he called for establishing a form-function relationship based on the communicative purposes of the participants. Thus, Swales (1981, 1988, 1990) prefers to use the notion of genre due to the assumption that it differs from register in the degree of importance genre analysis studies put on the communicative purposes within a communicative setting. Accordingly, Swales provides the following justification for adopting genre analysis:

The importance I attach to the attribution of genre-specificity derives from my belief that it is only within genres that viable correlations between cognitive, rhetorical and linguistic features can be established, for it is only within genres that language is sufficiently conventionalized and the range of communicative purpose sufficiently narrow for us to hope to establish pedagogically-employable generalizations that will capture certain relationships between function and form' (Swales, 1981: 10).

Added to this, Swales (1990) has gone further to maintain that it is the commonality of goals of the discourse community rather than the subject matter that gives birth to a genre and distinguishes it from other genres.

Thus, Swales reacted against the notion of register, and adopted Crystal and Davy's (1969) notion of genre as a cross-disciplinary plane cutting across register variations. However, this reaction can be supported only with reference to the Hallidayan register's constituent values of field, mode and tenor. This is because the communicative purpose of genre, the rhetorical moves, functional categories and the linguistic exponents out of which the genre is created and rationalised are more than the notion of genre. In other words, genres are driven by the communicative functions of registers.

Swales (1990) argues that the notion of register is a variety based analysis approach. It is restricted to a subject area such as biology or mathematics, whereas the potential of genre cuts across subject matter differences. He has adopted the communicative purpose criteria to provide interpretation of genre types participants encounter not in a subject specific but in different subject areas. Accordingly, texts associated with different academic and professional settings are regarded as belonging to a single genre, provided

that they have shared communicative purposes on the part of the participants. On the other hand, texts of the same subject matter having different communicative purposes are considered as instances of different genres, though they belong to the same subject area. Genre analysis of RAs not restricted to a single area of speciality (Swales 1981,1990); and “product” and “self advertising” through sales promotion and advertising (Bhatia, 1993) exemplify a genre based approach.

Although Swales has argued against the notion of register, he adopted functional labels to characterise his proposed generic moves that are a patterned articulation of a wider communicative purpose. Since genre has been associated with the communicative purpose, this seems to bear some resemblance to Halliday’s (1978) notion of register which is similarly associated with the same communicative purpose. That is to say, when Swales posited the communicative purpose as an identifying criterion of genre, this entails providing functional categories to realise the overall purpose of genre. The constituent functional categories are in turn realised by generic moves.

It could also be argued that Swales’ work on genre analysis seems to be closely affiliated to Sinclair and Coulthard’s (1975: 22- 25) ‘rank’ discourse model which was originally developed by Halliday (1961). In an analysis of teacher-pupil talk in classroom discourse, Sinclair and Coulthard consider the ‘lesson’ as the highest rank which is in turn realised by a series of ‘transactions’ at a lower rank. Each ‘transaction’ is also realised by a series of exchanges, each of which is realised by lower rank constituent moves. Each of these moves is in turn realised by other constituent speech acts. If we extend the metaphorical concept of Halliday’s ‘ranked constituent analysis’ to be dealt with as a ranked realisation analysis, we notice that a text as a semantic unit has an overall communicative purpose that unfolds in stages (Ventola, 1987). Each stage represents a communicative function articulated by one or more ‘moves’. Each move constitutes one or more steps, each of which indicates a function.

It is considered here as a ranked realisation analysis rather than a ‘ranked constituent analysis’ because the ‘text’, as a unit of analysis does not belong in the lexico-grammatical rank scale. That is because a text is a discourse semantic unit and not a lexico-grammatical unit. The relation between the text and everything below is not a one of constituency but a one of realisation (Halliday and Hasan, 1976: 2).

Let us take the RA genre as a representative example. First of all, the entire RA can be seen to have an overall communicative function. At a subordinate level, the RA consists

of different sized sections (IMRD) each of which has a communicative function. Each of these sections is a lower rank component of the RA. Part of the overall communicative purpose of the RA is the individual communicative function of each section. The communicative function of each section comes from the functions of the lower rank moves constituting each section. Similarly, each of these communicative moves is realised by one or more constituent steps each of which is in turn realised by certain linguistic components. This explanation appears as a rough equivalent to Trimble's (1985) functional discourse approach. His model also appears to involve functional rankings at two levels: communicative functions at a higher level and rhetorical techniques to realise these functions, constituting a lower level.

Leckie-Tarry (1993) indicates that the difference between Swales' definition of genre and Halliday's definition of register

'lies less in intent than in emphasis. While definitions of register attempt to relate situational factors, from which communicative purpose or function is assumed or recognized, with linguistic structure, Swales' position seems to interpret genre as referring to socially recognized communicative events where communicative purpose appears to be explicit' (p. 39).

As a result of looking at genre as a cross-disciplinary construct, some ESP practitioners have shifted focus from teaching texts based on the notion of register to paying attention to recurrent organisational patterns in a particular text, i.e. the moves and sub-moves of each section and the rhetorical organising techniques that are used to realise these tasks. Thus, one may argue that their analysis looks rather prescriptive, despite the fact that Swales (1981: 1) warns against this point. Widdowson (1983) refers to the shortcomings of genre analysis by saying 'it might lead us to suppose that form-function correlations are fixed and can be learned as formulae, and so to minimize the importance of the procedural aspect of language use and learning' (p.103).

The conclusion to be drawn is that register analysis and genre analysis complement one another and both of them are called upon for analysing genre, in the sense that when a genre analysis is carried out, a match between these types of analyses is required. At genre analysis level we look for the layout of the text to identify the rhetorical sections constituting this text. Then, each section is broken down into moves depending on the communicative purpose of each section, and each move is further analysed into its constituent steps, each of which stands for a minor function. However, this analysis cannot be conducted without the register's constituent values of tenor or mode. In other

words, move structures have nothing to say about the linguistic components used by writers to realise the communicative functions articulated by these generic moves. These particular linguistic component choices need to be rationalised through more than the notion of genre. Therefore, register level analysis is needed to look into lexical and structural choices that are employed by the writer or the speaker to realise the moves constituting a genre. It becomes quite clear that the relation between these two notions is complementary and supportive rather than divisive.

2.2.3.3. Swales' View of the Relationship between Discourse Community and Genre

Swales (1981, 1990) refers to the role of social factors in shaping genre structure. For him, the structuring of the moves of the genre is an echo of the accumulated and conventionalised social knowledge. To support the view that genre is socially motivated, Swales reviews the trends that lead to the situation of texts in their social contexts. He promotes genre as a defining characteristic of a 'discourse community' and concomitantly draws a critical distinction between 'discourse community' and 'speech community' to support his view.

The term discourse community, as used by Swales (1990), refers to members of a community who share a set of common public goals. Members work together to devise certain intercommunication mechanisms to pursue and achieve their communicative goals. To this end, they utilise certain genres to articulate their discursal expectations and common purposes.

Swales (1990: 24) draws the following distinctions between his chosen terms 'discourse community' and the socio-linguistic term 'speech community'. The first distinction is concerned with the mode of communication. Members of the discourse community correspond in writing irrespective of proximity, while members of speech communities commonly resort to the medium of speech rather than writing. Another distinguishing criterion is that a discourse community is a 'socio-rhetorical' grouping whereas a speech community is a 'sociolinguistic' one. The 'primary determinant of the linguistic behaviour' of the former is 'functional' in the sense that members intercommunicate to pursue their goals rather than to 'seek solidarity'. A further distinction is that membership in a discourse community comes as a result of 'relevant qualifications', recruiting, and training experience while membership in a speech community is acquired by 'birth, accident or adoption'. For Swales (1990), a discourse community

‘meets all six of the proposed defining criteria: there are common goals, participatory mechanisms, information exchange, community specific genres, a highly specialized terminology and a high general level of expertise’ (p. 29).

This definition seems to be powerful provided that the discourse community is perceived as a cross-disciplinary community, members of which communicate with each other about issues in which all of them are involved and concerned. However, positing such defining criteria for membership of the ‘discourse community’ results in constraining the shared communicative purpose of the community which in turn shapes the genres produced and owned. Thus, the communicative purpose rationalises the content, which in turn shapes the choice of the particular rhetorical organisation of the produced genre. In order to have membership in this community and accomplish communicative purposes, a member is supposed to be aware of the content, and the genre’s rhetorical structure used to articulate the communicative purposes which have become conventionalised in the tradition of the community.

In order to check the validity and the applicability of Swales’ (1990) definition of the notion of the ‘discourse community’, we are here using the academic community as an example of a discourse community to find out to what extent these defining criteria apply. Swales (1990) ‘perceives a genre as both a defining attribute of a given discourse community and as a cross-disciplinary construct. Since genre ownership is an attribute of a discourse community then it is arguable that RA writers will all be members of the same academic discourse community’ (Al Ali and Holme, 1999: 8). The question then arises as to what difficulties emerge when a genre like a research article, which is perceived by Swales as a cross-disciplinary construct, is posited as a defining characteristic of the academic discourse community? According to Swales’ definition of the discourse community, it is presumed that all RA writers, regardless of their subject matter and biological heritage, have membership, either explicit or implicit, in the academic community since they share a set of rules and patterns which govern the production of a particular genre. The members’ focus is on generic texts and specific lexis to promote their goals and maintain intercommunication. However, the academic community includes members who in some ways vary in terms of speciality and the lexical items used. The technical lexis they employ to communicate efficiently with

colleagues is highly specialised. For example, chemists or mathematicians are likely to use specialised terminology, abbreviations and acronyms puzzling to historians.

Important to the discussion that follows is the juxtaposition of generic formal schematic knowledge and content schematic knowledge among these groups of specialities.

Swales (1990: 86) points out that 'both content and formal schemata can contribute to a recognition of genres and so guide the production of exemplars'. In other words, the research article writer, as a member in the academic community, is supposed to be equipped with two types of schemata aiding in the production and comprehension of genre. Accordingly, a member has to be acquainted with both the organisational conventions of the RA genre, on the one hand, and the background knowledge of the content area and its technical terminology. Failure to produce or comprehend a genre such as a highly specialised text on mathematics, for example, is very likely to prove that this text is beyond the schemata of that member of the academic community. Consequently, understanding the lexical and technical terms of the genre seems a logical necessity to fulfil the criterion of academic community membership. However, in practice, members of the academic community often fail to satisfy this criterion. It is difficult to imagine historians and law RA writers being acquainted with the content and the technical items used by mathematicians and engineering RA writers. Thus, the former RA writers are, according to Swales' definition, likely to lose their membership of this discourse community.

Concerning the participatory criterion, members of each speciality use very specialised language and content materials; write RAs for very specialised journals; use an idiosyncratic register; and have their own meetings, as well as correspondence. On the other hand, the members of the academic community who belong to various areas seem neither to interact with one another at conferences, nor carry on discussions pertinent to the content of their particular genres, nor communicate through e-mail on their particular specialities. This is because they do not share the basic linguistic register and content.

However, members from various specialities still share social values, beliefs, rules, and some general academic practices as well as common conventions of scientific research that work collectively to construct the macro-structural level of organisation of an RA genre.

The conclusion following from this discussion is that research article writers from different disciplines who are supposed to be members of the same academic

community, according to Swales' defining criteria of discourse community, may have nothing in common in terms of shared technical terminology and intercommunication mechanism as well as the genre content schema. However, they may share common social conventions to determine the acceptability of a scientific genre regardless of discipline specificity.

Swales (1993) has modified his view of the concept of the discourse community. He perceives the notion as not 'taxonomic' and sees in an academic community, for example, 'concentric circles of co-membership radiating out from speciality or school to department to university to the locality' (p. 695). The more one moves from the periphery (wider discourse community) to the centre (discipline specific), the more s/he becomes confused with the discipline's features. This modification gives rise to the assumption that

'a genre as the property of a particular discourse community will then reflect this new fluidity. When community discourse is viewed as gathered around its core activities, then, perhaps, generic norms could be viewed as ensuring the accepted expression of community specialities. Equally, they can be perceived as losing their specificity as the address is opened towards a wider audience' (Al Ali and Holme, 1999: 9).

The aforementioned difficulty may be resolved if the notion of genre is also modified. In other words, a more flexible notion of genre is needed in order to accommodate the activities of the discipline-specialised communities, on the one hand, and to retain the notion of genre as a property of the academic community, on the other. As a consequence, one may regard members of various specialities as belonging to different sub-communities, all of which are subsumed under a broad umbrella, called the general academic community. Members of each sub-community have their own discipline specific allegiances as well as sharing similar genre conventions that are fairly apparent across a wide variety of specialities. Our view is similar to that of Johns (1997: 56) who suggests a 'juxtaposition of generalized and specialized' relationship in the various disciplines where members from various specialities 'may share certain values, language, and texts with others within their larger community, though their first allegiance is to their specializations' (ibid.). The author further suggests that 'a discussion of what are considered to be general academic languages and textual practices is a good place [for students] to start their analyses - although not a good place to finish' (ibid: 57).

On the other hand, an admission criterion is needed to set rules of membership in the academic community in addition to appointing 'gatekeepers (editors, referees) to regulate members' access to publication, and to deal with cases where the rules of the community are flouted by members' (Valle, 1997: 76).

Concerning genre production and ownership, we pointed out earlier that genres are products of discourse communities and thereby scaffolds within which discourse community purposes are constructed. Genres, above all, are social processes related to human experience. Collective shared activities and long shared experience give birth to shared communicative purposes realised through genres. Therefore the social activities and goals of the discourse communities are prior to genre; discourse communities precede and determine their products, i.e., genres. But who is responsible for the creation of these genres and how are they acquired? In this context, Swales (1990) claims that 'genres are the properties of discourse communities; that is to say, genres belong to discourse communities, not to individuals, other kinds of grouping or to wider speech communities' (p. 9).

Swales' social view of genre seems to be influenced by the work of the North American new rhetoric approach (Miller, 1984; Bazerman, 1988 and Freedman and Medway, 1994) which focuses on socio-contextual aspects of genre. The scholars have offered more detailed descriptions of the contexts in which different genres are used. They focused on genres as social actions, i.e. 'on the action it is used to accomplish' (Miller, 1984: 151). For example, Bazerman (ibid.: 322) emphasises the importance of the social context of the text in saying: 'The more you understand the fundamental assumptions and aims of the community, the better able you will be able [sic] to evaluate whether the rhetorical habits you and your colleagues bring to the task are appropriate and effective'.

Likewise, Berkenkotter and Huckin (1993) argue that genre knowledge is acquired through 'enculturation as apprentices become socialized to the ways of speaking in particular disciplinary communities. Because it is impossible for us to dwell in the social world without repertoires of typified social responses in recurrent situations' (p. 482). Similarly, Freedman (1993) suggests that teachers should expose students to genre in its social context in order to acquire genre and use it.

The new rhetoric scholars also emphasise the institutional setting of genre. They use ethnographic descriptions for analysing generic texts in scientific communities

(Bazerman, 1988) to offer a description of the academic contexts of genres and the actions they perform.

Although genres are properties of discourse communities, according to Bazerman's (1988) view, they initially emerged out of activities of individuals in an attempt to accomplish their goals. These individual practices may shape an existent genre to better serve their needs. When the shaped genre succeeds in carrying out the goals of the individuals it becomes a social practice. Bazerman (1988) suggests:

'Regularities occurred because individuals perceive situations as similar and make similar choices. Institutionalization and codification occurred because repeated choices appear to the collective wisdom (or wisdom of a few powerful actors) to be generally and explicitly advisable' (p. 317).

Similarly, the systemic linguists like Halliday and Hasan maintain that in order to be able to practise a particular genre you need experience of that genre. 'Familiarity with different genres does not grow automatically with growing age. For [familiarity] you need social experience' (1989: 68). 'Children need to be exposed to a wide range of genres- particularly those that are actively required in the educational process- for example, resume, report...' (ibid: 69). According to Kress (1994), learning a genre is like learning a

'rule governed language'. He suggests that 'learning genres... represents the child's socialization into appropriate and accepted modes of organizing knowledge, of knowing, and the modes of representing perceptions and knowledge to others. The learning of genre is therefore intimately linked with the codification of knowledge in a society' (p. 124).

As part of the process of writing genre, he argues, the child has to be taught at school how to master the established conventionalised forms of the genres and the possibilities of different genre types. Thus, learning genre occurs initially as a result of interaction on the social level. As Vygotsky (1978) explains: 'Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first *between* people (*interpsychological*), and then *inside* the child, (*intrapsychological*)' (p. 57). On the adult's level, members of any professional or academic community are recruited as novices and as a result of training, practice, interaction and long experience within their discourse community, they become acquainted with the genres utilised to realise the communicative goals of their community. When members acquire the genre process and it becomes part of their background knowledge, it is assumed that they, in turn, participate in translating the social activities and communicative purposes into written genres that conform to the

expectations and conventions commonly followed by members of the discourse community. When they master the genre conventions, they start to create a space (Swales, 1990) for themselves as members in this community by replicating these genres in an acceptable form and in accordance with the conventions of the discourse community.

2.3. Genre and Schema Theory

During the last two decades a number of studies have applied schema theory to the comprehension and interpretation of texts. Swales (1990) refers to the relationship between genre and schemata. According to his view, 'formal schemata need to be activated and developed' (Swales, 1987: 63). Thus, an emphasis is put on the importance of teaching research English genres to make students 'more sensitive to the rhetorical structures that more or less recur in specific genres' (ibid.), and 'that sufficiently match the reader's formal schemata' (Swales, 1990: 89). However, the author (ibid.) claims that schemata alone reflect a neglect of the communicative purposes of genres and their contexts.

The following section purports to explore how far schematic resources contribute to genre production and comprehension, as well as to speculate upon a possible relation between the formal schemata structures of generic texts and the forms in which the mind stores and organises background knowledge.

Schemata are formalised 'higher-level complex knowledge structures' (van Dijk, 1981: 141). Anderson (1977) perceives the function of schemata as scaffolding which organises background knowledge. Schema was first identified and used by Bartlett (1932) to refer to the organisation of prior knowledge. Bartlett developed this notion as a result of an empirical processing of visual and verbal stimuli. His investigation revealed that prior knowledge, which people form during their lives, plays a significant role in shaping their perception and understanding.

Bartlett (1932) argued that when an event occurs, it leaves a trace which is stored in the mind. According to his view, past experience is an organised accumulation of these traces rather than a string representing a chronological series of the individual original specific events the mind has encountered. These organised traces of facts and concepts represent our prior knowledge. Bartlett described schemata, which give structure to this organised mass, as dynamic structures. Schema is always subject to change; it is

adapted in the light of new experiences. Accordingly, 'schema refers to an active organisation of past reactions, or of past experiences, which is always supposed to be operating in any well-adapted organic response' (1932: 201).

The term schema has continued to be used by cognitive psychologists (Rummelhart, 1984; Carrell, 1983; Carrell and Eisterhold, 1988) to refer to background knowledge structure. Based on the tradition of Bartlett (1932), Rummelhart (1984) has held that schemata are abstract generic concepts stored in the mind. They are constructed by the mind on the basis of patterns of experience. A conception closer to this is adopted by Carrell (1983) and Carrell and Eisterhold (1988). Carrell (1983) draws a distinction between two types of schemata: '*formal* schemata (background knowledge of the formal, rhetorical organizational structures of different types of texts) and *content* schemata (background knowledge of the content area of the text)', quoted in Carrell and Eisterhold (1988: 79). The function of formal schemata, in Carrell and Eisterhold's view, is to store 'background knowledge about, and expectations of, differences among rhetorical structures, such as differences in genre, differences in the structure of fables, simple stories, scientific texts, news paper articles,...' (p. 79). On the other hand, content schema 'is claimed to be background knowledge about the content area of a text, such as a text about washing clothes... and so forth' (ibid: 80).

2.3.1. The Role of Schema in Genre Production

To produce a text, the producer is likely to refer to his stored background knowledge so as to relate the current input or the new experience to existing background knowledge to capture a portion of structured prior knowledge containing generic information about a particular text type (Eysenck and Keane, 1990: 275). For Van Dijk (1977), a producer of the discourse 'will begin with the construction of a (first) macro-structure, at least for the beginning of the text. At later stages of production this macro-structure may be corrected or replaced by another macro-structure' (p. 159).

The producer of a text presupposes that the addressee possesses the text's right schema that includes generic information about the rhetorical structure of the text. The text producer relies on the fact that his addressee knows enough about this genre so that he can refer to shared presuppositions to fill in the gaps that have not been explicitly provided. If a producer lacks the right schema, he becomes uncomfortable with this

genre. This discomfort stems from the discrepancy between knowledge assumed to exist in the producer's mind and what it is that he actually brings to the text.

Brown and Yule (1983: 250) speculate that 'background knowledge is organised and stored in some fixed schemata, together with some other, more flexible schematic structures'. The authors notice that Rumelhart and Ortony's (1977: 101) view of schema (as a representation of stereotypical concepts) and subschemata seems to bear some resemblance to Minsky's (1975) frames.

The term 'frame' as introduced by Minsky (1975) refers to stereotypical knowledge about a situation one has already encountered. The structure of a frame contains stereotypical locations of information called slots which can be filled or instantiated when one runs into a similar experience. Minsky perceives a frame as 'a network of nodes and relations. The "top levels" of a frame are fixed, and represent things that are always true about the supposed situation. The lower levels have many terminals - "slots" that must be filled by specific instances or data. Each terminal can specify conditions its assignments must meet. (The assignments themselves are usually smaller "sub-frames.")' (ibid: 212). de Beaugrande and Dressler (1981: 90) add that frames indicate what global patterns belong together; however, the order of these patterns is not relevant.

Other labels such as 'scripts', and 'scenarios' have been used as an alternative to schema to represent the background knowledge structure. The label 'script' is used by Schank and Abelson (1977) to refer to a sequence of related stabilised plans or stereotyped order of events describing a situation. Sanford and Garrod (1981) use the term 'scenario'. When we encounter a text on 'Going to a Restaurant', the scenario activates the knowledge of 'settings and situations as constituting the interpretative scenario behind a text' (ibid: 110). For example, the scenario will instantiate the 'waiter' although it is not mentioned in the text. They further maintain that to activate a scenario, 'a piece of text must constitute a specific *partial description* of an element of the scenario itself' (ibid: 129). As a step further, Bhatia (1993) brings in the psychological factors, which may have an impact on genre structuring, identification, and differentiation. Although Bhatia's perspective is largely based on the tradition of Swales (1990), he states clearly that his work differs from that of Swales (1990) '...in the way it brings in the psychological, particularly, cognitive level of genre construction' and that Swales' work 'underplays psychological factors' (ibid: 16). 'The psychological aspect of genre analysis reveals the cognitive structuring, typical of

particular areas of enquiry' (ibid: 19). The author further distinguishes two types of cognitive structuring of genre, namely, 'discriminative' and 'non-discriminative' strategies, both of which reflect the accumulated social conventions of discourse communities. The former type contributes to identifying genre and differentiating it from other genres, as well as to distinguishing sub-genres within the same genre (e.g. review article, research note, survey articles as sub-genres of the RA). The latter strategies, non-discriminative, are not supposed to change the nature or the communicative purpose of genre. Writers within a single genre exploit particular individual stylistic choices of linguistic components in structuring the moves of genre so as to create certain effects on the readers. For example, a news report in two different daily newspapers represents 'non-discriminative' strategies. To this end, members of the discourse community, either professional or academic, make use of the available structuring choices and strategies to achieve *their communicative purposes, taking into account professional and academic constraints which act on the internal structure of the genre.*

A lot of thought has gone into providing examples from professional and academic settings to illustrate the authors' view. Bhatia (1993) presents examples from 'product' and 'self advertising' through sales promotion and self-advertising. These examples indicate how texts from two different disciplines can in fact be considered as belonging to the same genre. The examples also indicate the role of individual strategic choices made by the author in order to make his writing more effective.

2.3.2. The Role of Schema in Comprehension

The other side of the coin is the role of schema theory in the process of understanding a new text type or genre. The question which arises here is how background knowledge affects the decoding and comprehension of genre. As an attempt to answer this question, it seems more convenient to consider the process of decoding and comprehension, a combination of which constitutes the process of reading (Smith, 1978). The exploration of the process of reading brings to the fore the various theoretical models of reading such as 'bottom-up', 'top-down' and 'interactive'.

Samuel and Kamil (1988) summarise the basic difference between the first two models as 'bottom-up models start with printed stimuli and work their way up to the higher-

level stages, whereas the top-down models start with hypotheses and predictions and attempt to verify them by working down to the printed stimuli' (p. 31).

Later on Stanovich (1980) has attempted to incorporate a 'compensatory- interactive model'. It is interactive in the sense that it involves interaction between bottom-up and top-down processing in reading and that both of them contribute simultaneously in decoding and interpreting meaning of the text. Stanovich maintains that, compensatory-interactive models hypothesise

'that a pattern is synthesized based on information provided simultaneously from several knowledge sources. The compensatory assumption states that a deficit in any knowledge results in a heavier reliance on other knowledge sources, regardless of their level in the processing hierarchy' (p. 63).

That is to say when a poor reader encounters an unfamiliar printed word in a text on a familiar topic, he may try to figure out the meaning of this word by relying on prediction based on his background knowledge of the topic context and subject matter. To what extent this background knowledge represented by previous experience affects written texts processing and understanding will be the focus of what follows.

Text processing is seen as an 'interaction of new information with old knowledge' (Anderson & Pearson, 1988: 37). To comprehend written texts, it is expected that the reader will use his previous experience of genre organisation to develop expectations and predictions about the content and the structure of the text. When a new text is encountered, the reader's schemata interact with the text. The bottom-up data processing activates the reader's appropriate schemata, relating meaning to existing knowledge. If the new information matches the reader's predictions made through his top-down processing, it can be said that successful interpretation is felt to take place. When the new input mismatches the reader's predictions and interpretations he tries to revise the interpretation so as to either accommodate the new information, modify it or reject it, if inconsistent with his/her existing background knowledge (Carrell *et al.*, 1988: 79).

For Van Dijk (1977), background knowledge of the macro-structure of a text facilitates comprehension of input during the process of reading. Besides, such macro-structures 'ORGANIZE the information in memory, thus at the same time serving as retrieval cues for more detailed information weakly entailed by it' (p. 157). The other type of schema which readers are said to possess is background knowledge of the content area of a text. Bransfort & Johnson (1973) and Kintsch (1974) share the view that a familiar content

may increase the possibility of activating the appropriate prior knowledge of text, i.e. 'gist' or the propositional content (Kintsch, 1974: 58-67) rather than the surface language features of the written text. Similarly, Van Dijk (1977) assumes that when readers encounter new texts they construct a 'macro-proposition representing the most 'important' information of that passage' (p. 156). This semantic core would at the same time be instantiated to provide clues for other subsequent input (ibid.). Furthermore, readers' interpretations are not restricted to the cohesive devices of the text. Successful readers can also make inferences to provide coherence to the text (de Beaugrande & Dressler, 1981: 8). To make sense of texts, readers are supposed to be equipped with both the discipline specific content background knowledge of the text and the appropriate formal background knowledge of the text structure, i.e. the genre that text belongs to.

To create meaning out of the written texts, readers should bring interpretation strategies based on prediction using their background knowledge into their processing of texts. The reader attends to reading with different types of predictions, of which some, particularly irrelevant predictions, are discounted gradually in the process of reading. That is to say, the more the reader proceeds in the reading task, the more he delimits the types and number of predictions. Furthermore, during reading, readers anticipate making use of certain signposts or clues in the written texts already provided by writers to guide their readers. This results in instantiating the typical schema on the part of the reader. On the other hand, violation of genre schema structure of the text and an unfamiliar topic may result in various degrees of noncomprehension. That is to say, comprehension is most likely to take place when the encountered input (text information) is related to existing knowledge structures.

2.4. Conclusion

We noticed how the literary approaches provide intellectual roots for applied linguists to draw on. For example, Todorov found generic models a source of reference for both the reader and writer. Similarly, applied linguists, systemicists and ESP teachers, were influenced by the idea of classifying literary works into types and by the relationship between literary genre and social conventions. Thus such ideas were extended by systemicists to classify recurrent conventionalised socio-linguistic actions into types.

Likewise, Swales employed such perspectives to consider communicative social events sharing an identifiable communicative purpose as members of the same genre.

As mentioned earlier, Barton (1984) and Gerhart (1988) postulated genre as a fixed and consistent system similar to generative syntax capable of producing an infinite number of similar genres. Thus, the metaphorical transfer of the generative genre indicated by Fowler (1982), and later on emphasised by Barton (1984), and Gerhart, (1988) appears to be related to the inspirational ideas underlying ESP practitioners and systemicists' notion of teaching generic models and their ideas of positing obligatory elements with possibilities of rhetorical choices.

However, when qualitative generic models are posited as consistent frameworks of analysis, it is difficult to predict the constituent elements constituting these models and to produce defining criteria or governing rules for these elements, because these models are susceptible to modification, and change due to the changeable social values that shape and are shaped by the produced genres.

Inconsistencies in Swales' notion of genre as a framework of analysis have also been discussed. Most of these arise from his not recognising what a register really is and partly from a conflated relation between genre and register. Evidence has shown that proponents of genre have described the notion of register as an outmoded field specific construct to promote a seemingly much more consistent notion of genre having the power to cut across disciplines.

However, we have pointed out that Swales' argument of promoting genre as a cross-disciplinary construct appears contradictory when genre is viewed as a defining characteristic of the discourse community. Our recommendation in this connection is as follows: In order to preserve a sense of relation between genre and the discourse community and the notion of genre as an cross-disciplinary construct but in a particular sense, we need to reconsider the relationship between genre and the discourse community, on the one hand, and to bridge the relation between genre and register, on the other, as is illustrated in the proposed model presented in Chapter Seven, Figure 7.1.

Furthermore, we have attempted to present the literature pertinent to the value for appropriate schema in understanding and producing generic texts. Most of the investigations focused on the idea that the new text encountered instantiates prior

background knowledge of similar texts. Such activation may lead to recognition of the text type and eventually to understanding.

On the other hand, other researchers such as Swales (1990) have given only tentative attention to schematic knowledge, due to the predominant concept that the communicative purpose of the writer is the focus of analysis of genre structures and that schema theory has not provided an equivalent framework.

However, there seems to be little knowledge of how far readers and writers make conscious or unconscious use of these schematic models stored in the mind. Thus, it becomes quite obvious that a sound account of genre should take into account; first, the psychological schematic aspect of genre to find out how far the background knowledge of genre enables producers and writers to organise genre rhetorical structures; second, how far genre producers are aware of the schemata of a particular genre; and finally, to what extent they resort to schematic knowledge either consciously or unconsciously in the process of composing and comprehension.

As a step in these directions, the rest of the present thesis purports to investigate the relationship between the writers' schematic knowledge and the rhetorical organisation of their produced genres.

3. Review of Genre Analysis Studies of RA Rhetorical Structure

3.0. Introduction

Over the past two decades, a thriving tradition of ESP genre analysis has been developed, particularly in Great Britain. This ESP drift towards pedagogical practices of genre analysis has been mainly inspired by Swales and his colleagues. Later on, this tradition was followed in the USA. ESP research has been mostly pedagogically motivated, with genre perceived as a tool for analysing and describing language in order to provide models for teaching writing and reading skills to nonnative speakers in academic and professional settings.

In their analysis and description of texts, ESP methodological approaches have varied in their focus. Some scholars have paid attention to the communicative functions of the particular linguistic components of genres, such as tense, voice, and hedges, etc. Such attempts which were restricted to lexico-grammatical features at the sentence-level of the generic texts have been described as a bottom-up analysis. 'These analyses, when placed within the context of the study of writers' communicative purpose and rhetorical strategies, play an important role in the higher-level analysis of the conventions of genres' (Dudley-Evans, 1994: 220). Also, Swales (1990) points out that these bottom-up linguistic components are utilised by writers to realise the communicative moves used to articulate the communicative purpose of a genre.

On the other hand, most other studies have adopted a top-down approach which aims at the analysis and the description of the global rhetorical organisational patterns of a given genre, such as the RA genre, abstracts, master dissertations, etc. However, a fully-fledged generic description, according to Davies (1988), 'requires... an awareness of the top level formal and content schemata for structuring [a genre], and of the lexis and syntactic forms which realize it' (p. 134).

Since both of the top-down and the bottom-up approaches are needed for describing the rhetorical organisational generic moves as well as the linguistic components utilised to realise these moves, we need to review the studies that have attempted to focus on these two approaches.

The purpose of this chapter is to review the related studies done on RA generic structure and the research carried out on linguistic components within the communicative functions of each of the rhetorical sections, Introduction, Methods, Results, and Discussion (henceforth often IMRD) of the research article to draw out and evaluate how far Swales' model was consistently reflected in the RAs from various disciplines analysed by genre analysts. Such a literature review helps to locate whether RA genre consistencies or inconsistencies across the disciplines analysed lie at the section level or at the move level. Besides, these studies can be used as a source of reference with which the findings of the present study could be compared and contrasted.

The first section of this chapter gives a brief account of the studies focused on the rhetorical functions of some linguistic exponents in the Introduction sections and the genre analysis studies that have focused on the rhetorical structure of this RA section. I then examine the ESP studies that have dealt with the linguistic components and the rhetorical structures of the Methods sections. The third section will focus on genre analysis studies pertinent to the RA Results sections. Genre analysis of the rhetorical structuring moves of the RA Discussion sections will follow. Also, reference will be made to studies that have extended Swales' model to other related sub-genres.

3.1. RA Introduction Sections

3.1.1. Bottom-up Linguistic Features across the Introduction Sections

ESP studies have explored the linguistic features and their rhetorical functions across a specific genre of research as a whole or at the level of individual rhetorical divisions. However, there is considerable variation amongst the studies in the features selected for investigation. Researchers have focused on diverse linguistic exponents such as 'that - nominals', aspect, tense, modality, voice, and thematic flow. Such studies are included in this section due to the importance ESP genre analysts attach to the relationship between the communicative functions of the RA genre rhetorical divisions and the linguistic components generally used to signal these functions.

ESP genre analysts anticipate that writers commonly select some linguistic features more than others to articulate the communicative purpose of a particular genre division. This sub-section aims to present and discuss the studies that have investigated how the communicative functions of the RA sections affect the frequency and choice of particular linguistic forms.

West (1980) endeavoured to establish a relationship between 'that-nominal' frequency and the four divisions of a biological scientific research article, namely: i) Introduction, ii) Methods, iii) Results, and iv) Discussion. The analysis showed that there were significant differences in frequency of 'that-nominal constructions' between the four rhetorical divisions. For example, the Introduction sections contain more 'that-nominals' than other sections. West (1980: 487) provides the following explanatory comment:

'The Introduction section, as the rhetorical section that motivates the study, normally includes a review of previous research. The fact that a primary function of the Introduction section is to make claims about statements from other research accounts for the high density of that-nominal constructions'.

Salager - Meyer (1994) revealed that the density of the use of hedging is influenced by the communicative function of the rhetorical sections of the RA. The author indicated that the more generalised the claim, the more hedged it is. For example, the Introduction section was found to be a heavily hedged section. The very high frequency of hedges in this section, as compared to those observed in the other sections, is due to the idea that the use of hedging devices allows the researchers to 'establish the territory' by making topic generalisation in the Introduction sections.

Heslot (1982) also examined the density of tense and voice in two life science RAs. The researcher found that the Introductions and Discussions contained 90% of the present tense finite verbs. According to her view, the present tense is employed in the Introduction sections to refer to the knowledge generally received to date.

In an attempt to investigate verb use in relation to rhetorical sections within twenty biology, chemistry and physics MSc theses, Hanania and Akhtar (1985) examined the use of finite verbs in relation to: voice, tense, aspect, and modality in the five rhetorical sections: Introduction, Review, Methods, Results and Discussion.

The study showed that there were significant differences in the use of verbs between the different rhetorical sections as well as between the different scientific disciplines. For example, it was found that in the Introduction section, the present tense predominated, while in the Review, the past tense was more frequently used. The explanation made by the researchers is that in the Introduction the writers 'make background generalizations, establish assumptions and state the purpose of the work' (p. 53). On the other hand, in

the Review section, the author reports previous work, thus past tense is used, and a slight increase of present perfect is noticed.

In an attempt to find out the means by which the writer introduces the subjective elements or the interpersonal dimension, Adams Smith (1984) examined a selection of medical articles. Her results indicated that the writers usually convey subjective elements by resorting to verbal modality (modal auxiliaries), non-verbal modality (especially adverbs such as probably, possibly) and attitudinal markers to actualise the communicative purposes in which the writers involve themselves. The results indicated that the author's comments are significantly more frequent in the Introduction.

Gunawardena (1989) has also addressed tense usage (particularly, the use of present perfect) in biology and biochemistry research articles. She observed that present perfect tense is frequently used in the Introductions to describe past experiments and to report past research relevant to the present study. By and large, Gunawardena's findings corroborate with those of other researchers such as Lackstrom *et al.* (1972), Oster (1981), and Hanania and Akhtar (1985) in that

'it is misleading to talk only about time lines with regard to the selection of tenses, because there are factors other than time-tense relationships governing tense choice in scientific journal articles. Factors such as the writer's attitude towards the importance of events, the degree of generality of the research described, or the particular context in which the discourse appears may influence the choice of tense' (Gunawardena, 1989: 272).

Following Swales (1981) who attempted to provide an account of the distinction between types of reference to previous research related to the topic to be presented on the basis of 'author orientation', Jacoby (1987) studied the various possible ways to refer to previous research in literary RAs. The author distinguishes five possibilities available to describe previous research: 'strong author orientation', 'weak author orientation', 'existential reference', 'contrastive references', and 'summary references'. The former two categories were first proposed by Swales (1981); however, several adjustments are made by Jacoby to encompass references in research articles which include footnote/endnote documentation. Within the first category, the RA writer mentions the cited author's name as subject or agent of the sentence in the running text. Reference is considered as 'weak', when the idea of the author is mentioned, but his name is placed in parenthesis within the sentence or at its end or placed in the footnote or endnote. Alternatively, 'existential' type of reference is adopted when the researcher asserts a claim in the presented text. This type appears in a form of footnote/endnote,

whereas in ‘summary’ references ‘no particular research predecessor is named, as a rule, but clear reference to the state of previous research as a whole or to the state of consensus knowledge can be identified’ (Jacoby, 1987: 55).

Jacoby’s distinction between ‘existential’ and ‘weak’ referencing types has been criticised by Najjar (1990: 131) as vague due to the proposition that ‘It is not totally clear if the difference might simply be whether the referenced author(s) is the originator of the idea presented in the citing statement or a supporter of that idea’.

Part of the rhetorical devices used by authors to organise English written discourse is the use of questions. As regards the use of this device, Webber (1994) investigated the communicative purposes of interrogative forms in different medical genres, including original research papers. The specific communicative purposes for which the author uses questions are dictated by what points in the genre, i.e. the beginning or the end of the text, these questions occur. The author argues that when these forms are used at the beginning of the texts, they allow researchers to arouse the readers’ interest and anticipation so as to engage them in thinking about what follows the questions, and to justify the claims made in the Introduction of the articles.

The literature reviewed to this point has focused mainly on studies concerned with certain ‘bottom-up’ characteristic linguistic features and their rhetorical functions across the various rhetorical sections of different genres. We have noticed how the rhetorical functions of these linguistic features vary across the rhetorical divisions of genre and how these linguistic exponents are determined by the communicative purpose of each rhetorical division.

3.1.2. RA Introduction Top-down Organisational Structure

Concomitant with the above-mentioned bottom-up studies are other studies motivated by the pedagogical need to develop a ‘top-down’ approach to describing the organisation of particular genres that would result in teachable generalisations.

The following section will concentrate on RA genre analysis studies that have focused on the rhetorical structures and ordering of the information presented in RA Introduction sections.

A good point of departure for our review of the RA genre rhetorical organisation is Swales’ (1981) work. In an attempt to offer a model to account for research article organisation, more specifically, for research article Introductions, Swales (ibid.)

proposed a '4-communicative move' model, which is genre specific for the analysis of written discourse found in the Introduction sections. The majority of the subsequent studies that have dealt with genre analysis have been influenced by this model. The four moves identified by Swales (1981: 22a) in the introductory sections of RAs are:

THE FOUR MOVES

MOVE ONE: Establishing the field

- A) Showing Centrality
 - i) by interest
 - ii) by importance
 - iii) by topic-prominence
 - iv) by standard procedure
- B) Stating Current Knowledge
- C) Ascribing Key Characteristics

MOVE TWO: Summarizing Previous Research

- A) Strong Author-Orientations
- B) Weak Author-Orientations
- C) Subject Orientations

MOVE THREE: Preparing for Present Research

- A) Indicating a Gap
- B) Question-Raising
- C) Extending a Finding

MOVE FOUR: Introducing Present Research

- A) Giving the Purpose
- B) Describing present research

Swales' immediate purpose was 'to see how writers structured and commented upon References to Previous Research' (ibid.). So he intentionally delimited the choice of his corpus to research article Introductions that contained reference to previous research. Another pre-condition attached to the selection of data was that only short Introductions rather than extensive examples were included. Later on, it will become quite obvious how these two pre-conditions affect the generalisability of his findings. To these ends, Swales based his data on a corpus of 48 article Introductions, 16 of which were taken from the 'hard sciences', 16 RAs from 'the Biology /Medical field', and 16 from the 'Social Sciences'.

What is interesting about Swales' study of research article Introductions is that he comes up with an approach that integrates descriptions of both the 'bottom-up' features and 'top-down' rhetorical manifestation of the schematic features that help to identify

and distinguish one genre from another. As apparent in the above model, Swales did not only sub-categorise the moves into steps, but he went further to the 'bottom-up' linguistic exponents by which the constituent elements of each move are signalled. Another major observation arising from this research is that Swales is interested in the communicative function of each section and even of each move and sub-move of each section and how each of them is textualised (Hopkins and Dudley-Evans 1988:115). For example, he observed that the general communicative purpose of a research article Introductions is persuasion. Therefore the writer tends deliberately to structure the introductory section in a way that attracts and keeps the attention of a busy readership. The 'writer has to 'sell' his product in the library market place' (p. 23).

Thus, the constituent moves, and the linguistic resources utilised to realise these rhetorical moves collaborate to articulate the major communicative function of the research article Introduction. Concerning this point, Hopkins and Dudley-Evans (1988: 115) think that Swales has provided 'a description that appears to take into account information content and structure as well as interactional features'.

Swales (1987) called attention to the point that he has succeeded in providing an underlying model acting as a source of reference sensitive to the rhetorical structural divisions that more or less occur in a specific genre. The mould proposed here does play a role not only in applying this schema to writing but also to reading skills, as it involves identifying the rhetorical sections, moves and sub-moves that comprise a text and the hierarchical textuality that align them. However, this mould should not be taken as a sacred one that all texts have to fit into 'but rather as *caricatures* which self-evidently simplify and distort certain features in an attempt to capture general identity' (Swales, 1987: 63).

Swales' approach has had considerable influence on subsequent studies. For example, it has been extended to sections other than Introductions (Dudley-Evans, 1986; Peng, 1987; and Najjar, 1990); however, certain defects have become increasingly apparent. His work has been criticised by Cooper (1985), Crookes (1986), Peng (1987) Dudley-Evans (1986), Hopkins and Dudley-Evans (1988), Swales (1990), and Jacoby, (1987) on the grounds that the study lacks empirical validation due to the original corpus selected for analysis. As mentioned earlier, Swales' corpus was deliberately restricted to short article Introductions and in particular, to those, which contain reports of previous research. As a consequence, move cyclicity arises when this model has been applied to long Introductions.

However, many genre analysis researches have subsequently adopted this model. Cooper (1985), in her work on publications of the Institute of Electrical and Electronic Engineering (IEEE), showed that Swales' 4-move-model did not altogether fit a corpus of 15 article introductions. The researcher reported that four of the Introductions did not contain a Move 2, and three had no Move 3. The author suggests that this can be attributed to the newness of the field of electronics, on the one hand, and to the fact that this subject area has been developing rapidly, on the other. Thus, not much research has been reported in this field. We may add to this point that Move 2 and Move 3, 'Summarising Previous Research' and 'Preparing for Present Research', are tied one to the other. Thus, since there are a few studies conducted in this new field, therefore the possibility to include Move 3, in which the RA writers refer to a gap in the previous literature, is also limited. Furthermore, this research was still rather virgin at that time. It is anticipated that electronics researchers may find it more convenient if they raid new related areas and investigate issues that are not very much related to the accumulated research.

Cooper also found that seven of the articles had a variety of alternative arrangements different from Swales' four basic units of discourse. For example, the following types of steps occurred in the RAs of electronics Introductions:

I. Placing steps which have orientation functions aiming at familiarising the intended reader with:

- a) content background,
- b) context background which includes placing current research within the context of the relevant research, and
- c) Indicating RA organisation and content.

II. Justificatory steps which mainly refer to the limitations of the previous research in comparison to the one to be presented. Such steps also explicate the value of the current research, including applications.

Added to these two functionary steps, Cooper (1985) found that 10 out of 15 of the Introductions closed with a step indicating the current research article structure. The high incidence of this step in Cooper's research, Swales (1990) argues, 'may well be connected to the absence of an established schema for research reporting in a new and rapidly evolving field' (p. 161).

In an attempt to offer an alternative rigorous analysis of RAs Introductions and to avoid personal and individual judgements, as well as to make a strong defence against

criticisms, such as those made against Swales' model, Crookes (1986) selected a group of raters (individuals with some linguistic sophistication) to analyse a corpus of scientific article Introductions. In his study, the researcher found that the four basic units of discourse proposed by Swales occurred in his data, and that the sequenced move structure 1-2-3-4 tended to occur in short article introductions, while this sequence was not noted in any of the social science Introductions. On the other hand, seven texts with short Introductions had no Move 3. Conversely, in complex long introductions, the moves are structured cyclically creating such patterns as (1-2-3-2-3-4) or (1-2-4-2-4). Crookes demonstrated that this considerable variation tends to occur in social sciences, which have much longer RA introductions than those in hard sciences. The researcher also observed that 'there was occasional use of topic - specific subheadings within the Introduction' (p. 67) of social sciences. He further suggested a possibility of a fifth unit, whose function would be 'presenting general, non-referenced theoretical background' (p. 67) to stand for stretches of texts functioning to familiarise the reader with a theoretical background of the current work. This suggested unit is similar in function to 'placing steps' proposed by Cooper (1985).

Crookes stated clearly that he used the same basic categories of RA texts 'the hard sciences', 'the Biology/Medical field' and the 'Social Sciences' so as to compare his findings with those of Swales. However, like Swales, Crookes included neither theoretical articles nor RAs which 'were not primarily experimental or data based' (ibid: 67) in his corpus.

Crookes' approach towards the analysis of RA Introductions seems to have some limitations. It should be noted for example, that the percentage of inter-rater agreement about the structure of general article Introduction was based upon 75% of cases only. Furthermore, the current analysis would not apply to theoretical articles or articles of the social studies based on pure mathematics (i.e. economics).

Another fundamental criticism of Swales' model has come from the difficulty of separating Move 1 & 2 (Dudley-Evans, 1986: 131). The author adapted Swales (1981) model for the analysis of Introduction and Discussion sections of the Plant Biology MSc dissertations. The more frequent moves identified by the researcher in the Introduction sections are:

- Move 1 : Introducing the Field
- Move 2 : Introducing the General Topic (within the Field)
- Move 3 : Introducing the Particular Topic (within the General Topic)
- Move 4 : Defining the Scope of the Particular Topic by
 - (i) introducing research parameters
 - (ii) summarising previous research
- Move 5: Preparing for Present Research by
 - (i) indicating a gap in previous research
 - (ii) indicating a possible extension of previous research
- Move 6 : Introducing Present Research by
 - (i) stating the aim of the research
 - or
 - (ii) describing briefly the work carried out
 - (iii) justifying the research

(ibid: 135)

The author noticed the omission of Move 1 in shorter introductions whereas in longer ones researchers opt to include an additional move ‘Defining the Scope of the General Topic’ before Move 3.

One can notice that similarities as well as a few differences arose out of Dudley-Evans’ (1986) extension of Swales’ approach to dissertation Introductions and of Crookes’ (1986) application of this model to long Introductions. For example, the studies revealed that the RA authors and the MSc dissertation researchers seem to adopt similar organisation patterns. The options they resort to are almost all found in Swales’ model. Regarding differences, the cyclical organisation at the move level was found to be very common in Crookes’ (1986) corpus, whereas the cyclical patterns were seen at a level below the move (i.e. step cycles) in Dudley-Evans’ adapted approach.

Another difference arises from the fact that Swales’ four-move model was extended to a six or seven-move sequence, due to the length of the Introductions of dissertations. Similarly, the structure of Introductions analysed by Crookes tends to have five sections. Added to these differences, Swales’ Move 2 (Summarising Previous Research) was no longer considered as a single Move but has become a constituent step in Move 1, according to Crooke’s validated analysis, and considered as a sub-move of the ‘Defining the Scope of the Particular Topic’ move identified by Dudley-Evans.

In an attempt to find out how far economics Introductions conform to Swales’ (1981) 4-Move model conventions, Dudley-Evans and Henderson (1990) studied the evolution of the economics article Introduction sections. I will include here the results of the analysis of the RA Introductions during the latest period 1961- 1980 reported by the authors. The results of their analysis revealed that the introductory section move structure of the

seven RAs analysed are in conformity with the patterns set out in Swales' model. However, one of the Introductions opens with the purpose of the study followed by a background information move. They also found that four RA writers include an additional move indicating RA structure, 'a feature of introductions in economics articles not accounted for in Swales' model, (p. 74).

The case of research article introductions has been given a very exhaustive account as a genre by Swales (1990). In response to the criticism raised by various studies that have commented on the neglect of the possibility of move cyclicity (Crookes, 1986); the difficulty of separating Move One (Establishing the Field) and Move Two (Summarising Previous Literature); the appearance of citations almost everywhere in longer introductions (Jacoby, 1986); and the occurrence of Moves or steps not accounted for in the model (Cooper, 1985; Crookes, 1986; Dudley-Evans and Henderson, 1990), Swales revised his earlier four move model and developed a three move model, instead, termed as 'Create a Research Space (CARS) which he represents as follows:

Move 1 Establishing a territory

- Step 1 Claiming centrality
and/or
- Step 2 Making topic generalization(s)
and/or
- Step 3 Reviewing items of previous research

Move 2 Establishing a niche

- Step 1A Counter-claiming
or
- Step 1B Indicating a gap
or
- Step 1C Question-raising
or
- Step 1D Continuing a tradition

Move 3 Occupying the niche

- Step 1A Outlining purposes
or
- Step 1B Announcing present research
- Step 2 Announcing principal findings
- Step 3 Indicating RA structure

(Swales 1990: 141)

As is shown in Swales' (1990) revised model, the author integrates Swales' (1981) Move 2 (Summary of Previous Research) and Move 1 into a single move; this new move is called 'Move 1. Establishing a territory'. Other minor changes include the

addition of an optional step, 'Counter claiming', to the new Move 2 'Establishing a niche'. Also, the author adds two options 'Announcing principal findings' and 'Indicating RA structure' to the new third Move.

However, combining the separated Move 1 and 2 of Swales' (1981) model in Move 1 of Swales' (1990) modified model has not resulted in an adequate and comprehensible solution to the problem. In his revised generic structure of RA Introductions, Swales (1990) has noticed stretches of citational categories sometimes occurring in the other moves of the Introduction. Similarly, citational forms are not associated only with the first move or all the moves of the RA Introductions; but rather, they tend to occur in other parts of the article (e.g. Discussion sections). Consequently, the cyclicity problem has not been resolved. For example, in long Introductions which appear to include high instances of citations, the current researcher, after reviewing each previous work, may include a reference to a related research which has evaluated this work rather negatively so as to create a space for the following citations. Accordingly, the cyclicity problem may appear after each reviewed work, resulting in the recurrence of the appearance of Move 2 after each reviewed item of Move 1\ Step 3 (Reviewing items of previous literature).

Swales further pointed out that move- cyclicity is influenced by the length of the RA Introduction and how the research field is perceived, so that ' if the field is viewed as branching - consisting of several loosely - connected topics - then a cyclic approach may be preferred' (p. 158-159).

Citation or reference in research writing has been identified as a major problem especially when it comes to form-function correlation. For instance, Jacoby (1987: 55) encountered a category of reference which she called 'summary'. In this category no previous researchers are specifically cited but there is an obvious reference to consensus knowledge, identification of a topic or past research as a whole. The researcher assigns these instances of citations to Move 1 step 3 of Swales' revised model on the assumption that this category of reference is realised by a seemingly similar citation form. Conversely, Swales (1990) suggests assigning this type of citation to Move 1- Step 2 (Topic generalisation) due to the proposition that these instances of reference perform the same discoursal function. Likewise, Bhatia (1993: 88) pointed out that a citational form might convey more than one 'discoursal value'.

Peng (1987) applied Swales' revised model to the Introduction sections of 10 chemical engineering RAs. The researcher found that the 10 RAs examined all have the move

structure of Swales and in the same hierarchical order (1, 2, 3) except for one having the order (1, 3, 2). The author points out that her findings regarding this section support Hill *et al.*'s (1982).

Hill *et al.*'s (1982) analysis of the organisation of a single RA in Psychology showed that the overall rhetorical structure presented by Searle (1978) (Introduction, Procedure, and Discussion) was noticed in the sample analysed. Their diagram, organisation of the overall structure of the RA, portrays a transition from general, represented by the RA Introduction, to particular which stands for Procedure, and back again to general represented by Discussion section. The author opens the RA with a description of the general background of the research to be presented. Then, he proceeds to focus on a particular topic. Finally, the researcher relates his findings again to the larger academic field from which he has already started in the Introduction section. Their findings, in connection to the analysis of this single Introduction section in psychology, revealed that this section begins with a presentation of the general field context, followed by a description of particular previous works. Then the author refers to the limitation of earlier studies. Such limitations, in turn, give rise to the motivation of the research to be presented.

In line with Swales (1981), Skelton (1994) offers a move structure analysis of the rhetorical structure of 50 RAs published in the *British Journal of General Practice*. All the RAs selected for analysis have the rhetorical structure, Introduction, Methods, Results, and Discussion. The researcher recognised four moves that tend to occur in the Introduction section. Each of these moves is associated with a common function and is likely to be realised by a set of lexical exponents. The following moves tend to occur in the RA sample. They are labelled according to Swales (1981) model.

Move 1: Asserting the importance of the field of study

Move 2: Discussing previous literature

Move 3: Drawing attention to a gap in the literature

Move 4: Stating the writer's aim

The author found that 60% of the Introductions include all four moves and 50% of the Introductions have these moves in the same hierarchical order (1, 2, 3, 4).

As indicated by Nwogu (1997), Skelton did not go further in his study for the analysis of the constituent elements of these moves, and did not provide an adequate analysis of the linguistic features that are used to realise the functions of these moves.

Using Swales' (1981, 1990) model, Nwogu (1997) developed a similar framework for the analysis of the whole body of 15 RAs selected from five medical journals. As a result of a detailed analysis, the researcher assigns eleven discourse functions to the whole RA structure. Each function is associated with a move. These moves tend to vary in their regularity of occurrence in the analysed RAs. He distinguished two types of moves: i) 'obligatory moves', those which occur regularly in all the analysed text, and ii) 'optional moves', those which tend to occur frequently. In the Introduction sections, the author observed the recurrence of three main moves; each move in turn consists of other elements or steps, each of which is realised by certain linguistic forms:

Move 1: Presenting Background Information:

by (1) Reference to established knowledge in the field.
(2) Reference to main research problems.

Move 2: Reviewing Related Research:

by (1) Reference to previous research
(2) Reference to limitations of previous research.

Move 3: Presenting New Research:

by (1) Reference to research purpose
(2) Reference to main research procedure

(Nwogu, 1997: 135)

The researcher distinguished the first move as optional; it tends to refer to established knowledge or to have an anecdotal or didactic function. The linguistic exponents recognised to realise this move are present tense verb forms, and locative or temporal adverbs. Within the second move, the first sub-move is realised by either of the following:

- 1- placing the author's name in the subject position,
- 2- using a common noun to identify the researcher,
- 3- referring to the outcome of research investigation, or by
- 4- generalised reference to previous research.

The linguistic features that were reported to realise Move 2 were as follows; when the author refers to a single research event, simple past tense is generally used, whereas the present perfect tense is used to refer to more than one research event. The author uses present tense forms with cases of previous research events having implications for the author's current research. Furthermore, authors may make use of adversative adverbial conjuncts (e.g. *however*) or negative forms to realise this move. The purpose of the new research, in the third move, is usually indicated by the use of explicit lexical signals (e.g. *objective*).

Having a cursory look at the moves and their constituent elements posited by Nwogu (1997), we realise that they bear resemblance to those proposed by Swales. However, we noticed the appearance of other steps, such as Move 3- Step 2, 'Reference to main research procedure', and Move 1- Step 2 'Reference to the main research problems'. Furthermore, the medical Introduction sections analysed did not consistently reflect the CARS model; Swales' proposed moves were identified but not necessarily in the same order.

In an attempt to examine the schematic rhetorical structure of RAs of computer science, Posteguillo (1999) studied 40 RAs from three different academic journals in the field. Based on Swales' (1990) CARS model, genre analysis of computer science RAs revealed that authors open their RAs with an Introduction section. Nevertheless, some RA writers name this section 'Introduction and Results'. Posteguillo reports that the rhetorical move structure found in the Introduction sections is similar to Swales' CARS model, and that cycles of moves are common in these sections. However, differences were encountered regarding the occurrence of certain steps. For example, 10 out of 40 RAs in the total corpus did not use *Reviewing items of previous research* although Swales considers this step to be an obligatory element. The author also noticed the frequent use of *Announcing principal findings* and *Indicating RA structure* steps. These two steps were found in 28 out of 40 RAs. Furthermore, he noticed that computer science RA writers tend to use *Indicating RA structure* to end their RA Introductions rather than using *Outlining the purpose of the study* or *Announcing present research* steps as indicated by Swales (1990).

The literature reviewed so far has largely focused on English RA genres. However, other studies, such as, Najjar (1990) carried out a genre analysis of Arabic Agricultural articles sections (Introduction, Methods, Results and Discussion) using Swales' model. Following Swales (1981) and Crookes (1986), Najjar excluded Agricultural Economics RAs for the reason that they are highly statistical in nature. All selected articles in the present Arabic corpus follow an IMRD format.

His detailed study of 48 articles revealed that Introductions of RAs within the same subject area seem to exhibit different rhetorical structures. The author reported that the hierarchical moves of the Swalesian model could not adequately account for the analysis of all these Introductions. For example, only 55% of his corpus fit this model. The author tried the 'Problem-Solution' model for the rest of his corpus. However, it failed to account adequately for the Introductions that did not fit the CARS model.

Consequently, the author proposed an alternative model which included an integration of moves or sub-moves borrowed and adapted from the CARS and the 'Problem - Solution' models.

His proposed 'Problem-Solution model for Article Introductions' includes the following four steps:

- Step 1 Identifying the nature and scope of the problem
 - A- announcing the problem (and its results) *and*
 - B- claiming centrality *and/or*
 - C- making topic generalizations *and/or*
 - D- identifying the cause(s) of the problem
- Step 2 Identifying the solution
 - A- need for specific type of study *or*
 - B- logical conclusion *or*
 - C- hypothetical solution *or*
 - D- solution as fact
- Step 3 Announcing the purpose(s) of present study
- Step 4 A- Reviewing the findings of the previous research
B- Indicating gap in previous research (optional) (p. 112)

The researcher claims that the adapted 'Problem-Solution' model accounts for two functions; namely: 'identifying a problem' and 'identifying a solution to a problem' which tend to recur in 18% of the corpus, whereas the CARS model fails to account for these functions.

For identifying the moves and their constituent elements, the author observed that certain linguistic features, either lexical or syntactic, are used by RA writers to signal the existence of these moves or steps. He further reported that cyclicity of Step 1 and 2 tends to occur in the CARS model as well as in the adapted model for Problem-Solution texts. For example, in cases of two or more related problems, each problem and its solution constitute a cycle.

As indicated earlier, Najjar (1990), Crookes (1986) and Swales (1981) deliberately excluded theoretical RAs or those, which contain statistics. This limits the generalisability of their conclusions because the quantificatory nature of theoretical RAs may entail a different communicative purpose; hence, a different rhetorical RA structure is required.

In summary, we have seen that most of the aforementioned studies carried out differ in minor details; however, Swales' (1981, 1990) has been largely successful in attempting

to establish a model that would probably fit different sets of data belonging to the same genre. Besides, researchers have thought of extending his model to other sub-genres (i.e. dissertation Introductions) and even to other sections of the same genre i.e. Discussion sections (Dudley-Evans, 1986; Hopkins and Dudley-Evans, 1988; and Peng, 1987). We have also noticed how the disciplinary variations (Cooper, 1985) and how the length of the Introduction texts (Crookes, 1986 and Dudley-Evans, 1986) constrain the structure. The following table presents a summary of the studies that have carried out a move analysis of the RA Introduction sections, together with the moves that have been observed to occur in these studies.

Table 3.1 Overview of the move-structure of the RA Introductions

Author	Swales (1981)	Cooper (1985)	Crookes (1986)	Swales (1990)	Skelton (1994)	Nwogu (1997)	Poste guillo 1999	Najjar (1990)
Moves and steps								
Move 1 Establishing a territory	+			+			+	
1. Claiming centrality	+		+	+	+	-	+	+
2. Making topic generalisation(s)	+		+	+		+	+	+
3. Reviewing items of previous research	+	+	+	+	+	+	+	+
Move 2 Establishing a niche	+			+			+	
Step 1. Counter-claiming	-		-	+		-	+	
Step 2. Indicating a gap	+	+	+	+	+	+	+	+
Step 3. Question-raising	+		+	+			+	
Step 4. Continuing a Tradition	+		+	+			+	
Move 3 Occupying the niche	+			+			+	
Step1 Outlining purposes	+		+	+	+	+	+	+
Step2. Announcing present research	+		+	+	-	-	+	
Step 3. Announcing Principal findings	-		-	+	-	-	+	
Step 3. Indicating RA structure		+		+	-	-	+	
Reference to main Research problems.	-	-	-	-	-	+	-	+
Identifying the solution								+
Step 3. Reference to main research procedure	-	-	-	-	-	+	-	
Presenting a theoretical non-referenced background	-	+	+	-	-	-	-	
Indicating research value	-	+	-	-	-		-	

3.2. RA Methods Sections

While the Introduction section must persuade the intended readership of the value of the research being carried out, the Methods section must convince them of the feasibility and the credibility of the findings. RA writers in the Methods section commonly provide a description of how their experimental or non-experimental procedures were

carried out in such a way that these methods could be repeated or verified (Huckin and Olsen, 1983: 278).

Due to the assumption that the Methods section is presented in the form of a checklist order and that native and non-native scientists would not find difficulty in managing specific information in it (Peng, 1987; Swales, 1981;1990), this section has received scant attention in the past literature.

In the present literature review of this section we will present the studies which have dealt with the rhetorical functions of the Methods sections together with the bottom-up linguistic features used to indicated these functions. Then I will review the studies that have considered the structuring moves and steps constituting the organisation of the Methods sections.

The findings of the first type of studies, the 'bottom-up' description, suggest that within a single genre, rhetorical sections having different rhetorical functions require different linguistic features to serve these functions. For example, the Methods section has been described as the carrier of the least marked thematic initials (Gosden, 1992). The author agrees with Swales (1990) that the Methods section is understood 'to take more of a linear checklist approach to contained information' (p. 215). Thus, this section requires fewer examples of marked theme.

Similarly, Salager-Meyer (1994) described this section as the least hedged section. She attributes the absence of hedging devices in this section to the fact that it is an explicit step-by-step description of the process or of what was done. Also, this section appeared to be the poorest section in terms of authors' comments contained, in comparison to the Introduction and Discussion (Adam Smith, 1984). This could be attributed to the primary function of Methods; that is to provide an accurate and objective account of the procedures used. According to West (1980), this section 'simply describes the process of obtaining the data, [it] rarely makes claims about other statements and consequently has almost no that-nominal constructions' (p. 487).

To achieve a sense of objectivity, RA writers make use of passive voice constructions to describe procedures (Hanaia and Akhta, 1985); therefore, markers of first person were lacking in Materials and Methods (Heslot, 1982). However, Tarone *et al.*(1981) point out that writers of the *Astrophysics Journal* tend to use the first person plural active *we* form where they have a unique procedural choice, whereas the passive tends to be used when the authors follow established procedures.

On the other hand, looking at the profile of verb use in MSc dissertations of biology, chemistry, and physics, Hanaia and Akhtar noted disciplinary variations with respect to the use of linguistic components in the Methods sections. They reported a predominance of the present simple over the other tenses in physics as well as a drop in the frequency of passive structures in the Methods section of this field. The assumption made by the researchers is that these disciplinary differences may be attributed to the mathematical and theoretical nature of physics and that the Methods section is mainly 'concerned with discussions of mathematical models and their application to the problem at hand' (p.54). Less frequency of past passive is used in the Methods section, since in this rhetorical section of physics only little procedures followed are described.

Variations in richness in these linguistic features have been ascribed to the proposition that the different sections of the RAs vary in their communicative functions, which in turn require different linguistic exponents to realise them.

In the following section we will review the studies that have reported on the most common rhetorical components adopted to organise this section.

Hill *et al.* (1982) point out that the procedures section which consists of Methods and Results, according to their classification, gives all the information to the reader so that any researcher having the same resources and a similar background knowledge can replicate the research article. They note that the Methods section is 'a chronologically ordered section, a step-by-step description of the process used to obtain the data, arranged according to the time sequence followed' (p. 336).

Najjar (1990:149) distinguishes six components that seem common to the majority of Methods sections in Arabic agricultural research articles; these components tend to occur in the following order:

1. 'Establishing time and place of study'
2. 'Re-announcing purpose(s) of study'

This component occurs in 12 articles. In four of them, there was no previous statement of the purpose in the Introduction section, whereas in the other cases the author re-announces the purpose but in more detail.

3. 'Describing investigative sample(s)'
4. 'Describing study design'
5. 'Describing investigative and experimental procedures'
- 6- 'Describing statistical procedures for data assessment'.

According to Najjar, these components do not follow a strict order, and some of these components, such as ‘Describing investigative and experimental procedures’ commonly occur in cycles. However, the researcher did not provide instances showing this tendency. He also realised that most of the standard procedures followed are named rather than described, and sometimes numbered or read like a checklist. The researcher noted that when procedures are only named and not described, the author presupposes a specialised knowledge on the part of the peer researcher or intended reader. However, a detailed step-by-step description is provided when new procedures are employed. The researcher’s findings regarding this section seem to be in conformity with those reported by other researchers in other languages.

As mentioned earlier when we talked about the literature review pertinent to the Introduction sections, Skelton (1994) and Nwogu (1997) attempted to extend Swales’ model of RA Introductions to the whole body of original medical RAs. Skelton, in an account of 50 Methods sections in the *British Journal of General Practice*, identified three moves that tend to occur in these sections. These moves are numbered and ordered as Move 5, Move 6, and Move 7 with respect to the list of the whole 15 moves contained in the research article.

Move 5: Identifying the population of the study: Exponents such as ‘numbers and dates, and labels of occupations, social roles and class’ tend to signal this move. The researcher pointed out that this move is sometimes accompanied by a tied move to ‘assert the inclusiveness of the population under study’ occurring immediately after or interwoven into Move 5. This move commonly occurs with linguistic exponents such as ‘every’, ‘all’, and ‘each’.

Move 6: Describing procedures (e.g. questionnaire): This move is also associated with a rare justificatory tied move to justify the choice of a particular procedure.

Move 7: Naming statistical tests: It is signalled by sub-sections labelled ‘analysis’ or ‘statistics’. Like the previous moves, this move is also accompanied by a tied move to justify statistical choices.

The author found that 86% of the Methods sections contained all these three moves and 74% of the Methods sections of the corpus had them in this order (5, 6, 7). Added to this, he maintains that these sections are ‘content-driven’ so they are described as more heterogeneous than other RA sections.

Nwogu (1997) also proposed three moves that tend to recur in the Methods sections of medical RAs; these moves stand for Move 4, Move 5, and Move 6. Each of these moves is further categorised into sub-moves.

Move 4: 'Describing Data-Collection Procedure'

This move is expressed by:

- a- 'Indicating source of data' realised by the use of passive forms,
- b- 'Indicating data size' signalled by present or past tense forms, and
- c- 'Indicating criteria for data collection' expressed by the use of explicit lexemes.

Move 5 : 'Describing Experimental Procedures'

This move tends to occur in texts based on laboratory tests. It has the following constituent elements:

- a- 'Identification of main research apparatus' signalled by means of explicit lexemes where the name of the apparatus occurs as a subject of the clause or as an adjunct in passive constructions.
- b- 'Recounting experimental process' realised by the passive verb forms or the use of temporal adverbials.
- c- 'Indicating criteria for success' expressed by the use of explicit lexemes.

Move 6: 'Describing Data Analysis Procedures' includes constituent elements, such as 'Defining terminologies', 'Indicating process of data classification', 'Identifying analytical instrument/procedure', and 'Indicating modification to instrument/procedure'. The researcher noticed that these particular functions are realised by means of explicit lexemes and passive verb forms.

This study appears to be much more adequate than the other studies reviewed due to the fact that Nwogu went further in the analysis not only of the moves which constitute these rhetorical divisions, but also he analysed the constituent elements of each major move and the linguistic features that are utilised to signal the functions of these sub-moves.

Unlike the above-mentioned studies, the following two studies of Huckin and Olsen (1983), and Brett (1994) have attempted a general description of Methods sections without providing a move analysis of this section. For Huckin and Olsen (1983:278-279), an RA writer should include the following constituent elements in the Methods section of a good RA: identifying the materials used, identifying the limiting conditions of the experiment, describing procedures, and justifying materials and procedures.

Brett (1994), in addition to conducting a detailed analysis of the Results sections of 20 sociology RAs, provided an idea about the general organisation of their Methods sections although a move analysis of this particular section has not been carried out. The author pointed out that the Methods sections in Sociology RAs displayed variations in the headings: 'Methods', 'Data and Method', 'Methodology', 'Data and Measurement', 'Research Setting', and 'Research Strategy' (p. 50). The constituent elements of the Methods sections are: describing data collection procedures, defining concepts and variables, and stating statistical techniques. The researcher attributes the greater length of the sociology sections in comparison to those in hard sciences to the assumption that 'there is less unanimity as to methodological practice' (ibid: 50).

A careful look at the components or moves of the Methods sections proposed by Najjar (1990), Skelton (1994) and Nwogu (1997) reveals that components 3, 5, and 6 of agricultural RAs representing Methods sections are similar to moves 4, 5, and 6 of medical Methods sections postulated by Nwogu. They also bear resemblance to moves 5, 6, and 7 of the Methods sections of the medical RAs proposed by Skelton.

The following table provides a summary of the studies that have attempted a move analysis of the Methods section. The table also demonstrates the categories noticed by Brett (1994); and those prescribed by Huckin and Olsen (1983), despite the fact that both of the latter researchers did not carry out a detailed move analysis.

Table 3.2 Overview of the Move-structure of the RA Methods sections

Moves and Steps	Posteguillo (1999)	Nwogu (1997)	Skelton (1994)	Brett (1994)	Huckin & Olsen (1983)	Najjar (1990)
Describing data collection procedures	No	+	+	+		
Indicating source of data	Method	+	+			
Indicating data size	section	+	+			
Indicating criteria for data collection		+	+			
Describing experimental procedures		+	+		+	+
Identification of research apparatus		+				
Recounting experimental process		+				
Indicating criteria for success		+				
Describing data analysis procedures		+				+
Defining terminologies		+		+		
Indicating process of data classification		+				
Identifying analytical instrument		+	+	+		+
Indicating modification to instrument		+				
Identifying the materials					+	
Identifying limiting conditions					+	
Justifying materials and procedures			+		+	
Establishing the setting of the study						+
Re-announcing purpose of the study						+
Describing a study design						+
Describing investigated sample						+

In summary, it has become obvious that procedures are either described step-by-step or just named depending on their type and intended readership. When the author develops his own procedures, the reader anticipates that he will be provided with enough information to be convinced of the credibility of the findings. On the other hand, in many other Methods sections, the procedures are only named and appear in rather compressed or condensed sentences (Bruce, 1984), which require a readership equipped with a specialised background knowledge. Swales (1990) suggests that the intended readership should rely on coherence strategies rather than on cohesion devices because

the sentences of this section are heavy in 'rheme' and light in 'theme'. He further maintains that 'In many Method paragraphs the sentences are like islands in a string, islands which only those with specialist knowledge and experience can easily jump across from one to the next' (p. 168).

3.3. -RA Results Sections

As the Methods section is anticipated to convince the intended reader of the credibility of the results generated by the adopted procedure, the Results section paves the way for the Discussion section that follows. Generally, it has been noticed that RA researchers present their results in a separate section and the interpretations fall into another section called the Discussion section. However, other researchers integrate both of these sections under an encompassing title called 'Results and Discussion' that addresses the presentation and the interpretation of results. This integrated section is supposed to present the significant results and interpret them. Thus, its rhetorical structure bears some resemblance to the Discussion section. However, integrating the Results section into the Discussion section is either an authorial decision or an editorial policy.

Overall, the researcher should show objectivity in the presentation of his results. To achieve this end, the researcher may utilise several devices. Thus, the Results section may include figures or tables followed by a summary drawn from the analysed data. In addition to visual non-verbal data, the researcher's objectivity may be realised by the use of certain linguistic features, lexical, grammatical, or organisational. Making use of these devices, the RA writer sets the stage for the Results section to articulate its communicative purpose within the structure of the RA.

In their analysis of bottom-up linguistic features of generic texts, ESP related studies have examined the linguistic components. They have attributed the density of these linguistic features to the rhetorical function of the specific genre section. For example, with regard to the medical RA Results section, Salager-Meyer (1994) revealed that these sections present a low incidence of hedging compared to the Introduction and Discussion sections. Similarly, 'the Results section, which describes the process of manipulating the data obtained from the Methods section and makes only limited claims about the statistical tests, has fewer that-nominals' (West, 1980: 487). Thus, the RA writers are expected to present their Results without commenting, interpreting, or

claiming about them. The reason stems from the fact that the only section qualified to carry out these functions is the Discussion section. However, there might be disciplinary variations concerning the communicative purpose of this section, as is the case in sociology RAs (Brett 1994).

On the other hand, Heslot (1982) and Salager-Meyer (1992) revealed that the Results sections, in comparison to the other RA sections, contained a higher density of past active tenses to report their results and supporting data.

In what follows we will present studies that have dealt with the top-down rhetorical organisation of this particular section.

Using the genre analysis model as a system of analysis, Brett (1994) investigated the Results sections of 20 sociology RAs to provide a description of the communicative categories and the lexico-grammatical exponents used to signal these categories. The author presents a model of communicative options consisting of three basic categories for the analysis of this particular section. These categories are:

- a) **‘Metatextual Categories’** that refer to data or guide the reader to other parts of the text, with two functions: ‘Pointer’ and ‘Structure of Section’;
- b) **‘Presentation Categories’** that highlight the results objectively and transform the figures in the visuals into a written text, with five functions: ‘Procedural’, ‘Hypothesis Restated’, ‘Statement of Finding’, ‘Substantiating of Finding’, and ‘Non-validation of Finding’;
- c) **‘Comment Categories’** with the following functions: ‘Explanation of Finding’, ‘Comparison of Finding with Literature’, ‘Evaluation of Finding’, ‘Further Question(s) Raised by Finding’, ‘Implications of Finding’, and ‘Summarising’.

The author found a cyclical pattern of moves; each cycle has ‘Statement of Finding’ as an obligatory move. The only core cycle found to occur in all the corpus analysed is: ‘Pointer - Statement of Finding - Substantiation of Finding’. Commentary categories tend to occur after this core pattern, whereas the other categories such as ‘Structure of Section’, ‘Hypothesis Restated’ and ‘Procedural’ are placed before this cycle to form part of the pattern.

It is worthwhile mentioning that, according to Brett, the Results section of Sociology RAs is the largest section (40%), whereas the Discussion is the shortest (15.7%). The latter only ‘provides a general summary of the article and also to comment on implications for future research’ (p. 50).

The researcher noticed that the Results sections of sociology articles show some resemblance to the Discussion sections of Science and Technology RAs analysed by Hopkins and Dudley-Evans (1988); both of them share some communicative categories. Likewise, the structural patterns of the sociology Results have certain similarities to the Results sections suggested by Weissberg and Buker (1990).

Following Brett's model, Posteguillo (1999) identified the rhetorical communicative categories contained in the Results sections of computer science RAs. In a total corpus of 40 RAs, the author reported that only 22 computer science RAs have a Results section. His analysis revealed that the 22 RAs contain the same communicative categories proposed by Brett (1994). However, minor variations were noticed with regard to the cyclical organisation in which these categories are structured and the type of sub-communicative categories contained. For example, I noticed the absence of sub-communicative categories such as *Explaining Finding* and *Further Question(s) Raised by Finding*. Regarding cyclicity of moves, the author noticed that the results are structured around two types of cyclical patterns. A move cycle consists of either the following chain of moves:

- '(a) *procedural-pointer- statement of finding*; and
- (b) *procedural-pointer-evaluation of data*.' (Posteguillo, 1999: 156).

However, Brett (1994) found that the most commonly used cyclical patterns are:

- '(a) *pointer-statement of finding-substantiation of finding*; and
- (b) *pointer-statement of finding-substantiation of finding-comment*'.

Posteguillo pointed out that the absence of the Methods section from computing RAs explains the frequent use of *procedural* communicative categories in this field.

In line with Swales, Skelton (1994) conducted an analysis of medical RAs. Texts in the corpus were analysed into hierarchical schematic structures or 'moves'. He found that the Results sections in his corpus contain four moves which represent 'Move 8', 'Move 9', 'Move 10', and 'Move 11' in the structure of the body of RA which consists of 15 moves.

Move 8: Adjustment and exclusions from the original population: Explicit lexemes such as 'withdraw', 'refused', or 'excluded' are often used to realise this move.

Move 9: Presenting results in tables,

Move 10: Discussing data: This move highlights and translates key areas of the tabulated data into written texts.

Move 11: Assessment of data.

The researcher pointed out that Moves 10 and Move 11 occur together, and some times the Results section consists of repeated cycles, each cycle consisting only of these two moves or a list of move 10s.

Adopting functional labels to characterise moves and their constituent elements, Nwogu (1997) recognised that the Results sections of medical RAs include two moves, which represent Move 7 and Move 8 in the body of the RA which in turn contains 11 moves.

‘Move 7: Indicating Consistent Observation by

(1) Highlighting overall observation

(2) Indicating specific observations

(3) Accounting for observations made

Move 8: Indicating Non-consistent Observations’ (p. 135)

The constituent elements of Move 7 are signalled by the use of ‘preparatory expressions’, ‘passive and present tense forms to refer to visuals’, ‘existential constructions’, ‘past tense to report results’, and the use of ‘hedging devices to account for observations made’.

Move 8 presents unexpected results generally by the ‘use of negative verb phrases or negative qualifiers’. The researcher noticed that this move is optional, flexible in position and has a low frequency of occurrence.

After a careful look at Nwogu’s move analysis of Results sections, we realise that he identified two moves, 7 and 8; the former is obligatory while the latter is optional. The seventh move appears to be generalised to encompass the four moves posited by Skelton (1994) for this particular section. That is to say, the constituent elements of Move 7 seem to correspond fairly closely to Skelton’s Moves 9, 10, and 11. Furthermore, the moves of the Results sections analysed by both researchers appear not to follow a stable order except for Move 8 encountered in Skelton’s texts.

There have so far been a limited number of studies which have attempted a detailed investigation of the discourse structure of the Results section of RAs. This might be due to the assumption that the Results section is like the Methods section in structure; it

reads like a checklist of results, therefore non-native speaker researchers may not need to be provided with particular principals of organisation. Added to this assumption, is another proposition which says that ‘description of method and the writing up of results are central and highly conventionalized products of a science education extending from the middle school years to postgraduate study’ (Swales, 1981: 1).

The results of the move analysis of the studies reviewed so far produce the following table, listing the moves that have been identified by the researchers.

Table 3.3 Overview of the move-structure of the RA Results sections

Authors Moves and Steps	Brett (1994)	Skelton (1994)	Posteguillo (1999)	Nwogu (1997)
Indicating Consistent Observations				+
Highlighting overall observation				+
Indicating specific observations				+
Accounting for observations made		+		+
Indicating non-consistent observations				+
Adjustment & exclusion from Original data		+		
Presenting results in tables		+		
Assessment and interpretation of data		+		
Metatextual categories (pointer, indicating section structure)	+		+	
Presentation categories	+		+	
Procedural	+		+	
Hypothesis restated	+		+	
Statement of finding	+		+	
Substantiating finding	+		-	
Non-validation of findings	+		-	
Comment Categories	+		+	
Explanation of Finding	+		-	
Comparison of finding with literature	+		+	
Evaluation of finding	+		+	
Further questions raised by finding	+		+	
Implications of finding	+		+	
Summarising	+		+	

3.4. RA Discussion Sections

The Results section sets the stage for the Discussion section to interpret, explain, hypothesise, evaluate, deduce, conclude, and recommend on the basis of the outcome of the research to be reported. Thus, the literature review pertinent to the Discussion sections will include the studies that have attempted to correlate the occurrence of certain linguistic features with the aforementioned rhetorical functions of this section, as well as the studies which have considered the rhetorical organising moves that tend to articulate the communicative purpose of the Discussion section.

Thus, this section opens with the studies that have dealt with examining the bottom-up linguistic features of the Discussion and proceeds to review the rhetorical moves constituting these sections as reported by the following studies.

The Discussion, as rhetorically multifunctional in nature, is supposed to include linguistic components that realise these communicative functions. For example, this section, 'as the rhetorical section whose primary function is to explain the statistical findings in non-statistical English, makes many claims about the research findings and therefore contains many that-nominals' (West, 1980: 487). The multi-functions of the Discussion sections, such as making claims, justifications, suggestions, and generalisations about the research findings explain why hedges are most frequently used in these sections (Salager-Meyer, 1994), and also explain much of the variation of topic shifting density signalled by using examples of marked themes (Gosden, 1992). Furthermore, the frequent use of verbal modality (Adams Smith, 1984) to convey subjective elements on the part of RA writers is another added function.

Hanania and Akhtar (1985) found a rise in the frequency of present tense as well as of modal auxiliaries in the Discussion sections. Here again, the explanation given to this tendency is related to the communicative function of this rhetorical section i.e., 'the simple present expresses generalizations and conclusions based on the results of the research, and modals help to qualify interpretations and conclusions' (p. 53). Also, Gunawardena (1989) found that the use of present perfect tense is frequent in the Discussion where RA writers tend to quote, compare and report previous related studies to their current studies. Thus, it was observed that the present perfect tense is used to realise these functions.

Among the pioneering attempts carried out on the description of the rhetorical organisation of the RA Discussion sections are Hill *et al.* (1982) and Belanger (1982). Hill *et al.* suggest an hour glass diagram to show the overall rhetorical structure of a single research article in psychology. As is shown in the figure below, ‘the discussion section is essentially a mirror image of the introduction’ (ibid: 337).

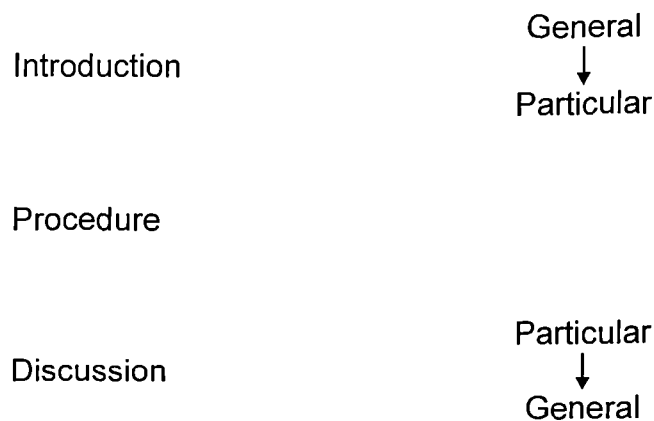


Figure 3.1 Overall organisation of the research paper (Hill et al. 1982)

On the other hand, Belanger (1982), who studied 10 articles in neuroscience, found that ‘the structure of the discussion section is closely correlated to both the number and kind of research questions posed in the introduction sections of the paper’ (p.1), quoted in Swales (1990: 171). The rhetorical organisation of the Discussion section, as suggested by Belanger, begins with an optional Introduction followed by a series of answers to the questions raised in the RA Introduction section; each answer is in turn presented in the form of a cycle of moves, and then, the section closes with an optional conclusion.

Following Swales’ pioneering work on the analysis of RA Introductions (1981, 1990), Dudley-Evans (1986); Peng (1987); Hopkins and Dudley-Evans (1988); Skelton (1994); Nwogu (1997) and Posteguillo (1999) extended Swales’ model for the analysis of the Discussion sections. Their approach to the analysis of this particular section ‘draws its inspiration from Swales’ original work’ (Dudley-Evans, 1994: 220).

As a result of extending the move analysis approach to the analysis of plant biology MSc dissertations Discussion sections, Dudley-Evans (1986) found that this section contains three parts; ‘Introduction’, ‘Evaluation of Results’, and ‘Conclusions and Future Work’. The researcher noticed that the Discussion sections open with an introductory part including a re-statement of the purpose of the study, a reference to a

gap in the reviewed literature to justify the research to be presented. The second part of the Discussion, 'Evaluation of Results', was found to consist of one or more cycles; each cycle, in turn, embraces two or more of the following moves:

- 1- 'Information Move'
- 2- 'Statement of Result'
- 3- '(Un)expected Outcome'
- 4- 'Reference to Previous Research (Comparison)'
- 5- 'Explanation'
- 6- 'Problems with Results'
- 7- 'Hypothesis'
- 8- 'Deduction'
- 9- 'Reference to Previous Research (Support)'
- 10- 'Recommendation'
- 11- 'Evaluation of Method'

Dudley-Evans noted that the authors tend to present their results in cycles; each cycle is headed by the obligatory move 'Statement of Result', which may only be preceded by the 'Information Move', whereas the other moves follow this obligatory move in order. It is worth noting that the cyclical organisation of moves has already been encountered in the Introduction sections by many researchers. Dudley-Evans, on the other hand, found that the cyclical move pattern is also 'a very strong feature of the Discussion section' (p. 144).

However, Dudley-Evans (1993) found significant differences between the Discussion sections of plant biology dissertations and those of the Highway Engineering dissertations in the way they are structured. The main difference is that, in plant biology, the writers initiate a move cycle with a 'Statement of Result' move followed by other moves commenting on the result obtained, so as to situate the findings of the research to be presented within the previous literature. In the highway engineering Discussion sections, however, the authors focus on the results, and fewer attempts are made to relate these findings to the on-going research. Dudley-Evans noticed a high frequency of 'Recommendation' moves in the highway Discussion sections. According to his view, this might be attributed to 'a discipline in which there is not a huge amount of previous research to refer to and which sees its work in the context of practical suggestions that the practising engineer can put into operation in the field' (p. 145).

In an attempt to identify a set of moves that would fit the Discussion sections of both the RAs and MSc dissertations, Hopkins and Dudley-Evans (1988) considered MSc dissertations of plant biology and research articles in 'drainage'.

The researchers established the following optional moves, which are very similar to those proposed by Dudley-Evans (1986): 1. 'Background Information', 2. 'Statement of Result', 3. '(Un)expected Outcome', 4. 'Reference to Previous Research (Comparison)', 5. 'Explanation of Unsatisfactory Result', 6. 'Exemplification', 7. 'Deduction', 8. 'Hypothesis', 9. 'Reference to Previous Research (Support)', 10. 'Recommendation', and 11. 'Justification' (p.118).

The authors maintain that the length of the Discussion gives rise to the cyclical move patterns of this section. Due to this cyclicity which originally stems from the interpretative nature and irregularity of move sequencing, the linear description of RA Introductions proposed by Swales was found to be inadequate for the analysis of the Discussion section. According to the authors' view, this can be attributed to the fact that the basic unit of organisation for the Discussion section is the cycle.

Dudley-Evans (1994) presents an analysis of a part of an MSc dissertation. He showed that this part embraces all of the set of moves proposed in Dudley-Evans (1986) for the Discussion sections of seven MSc dissertations. However, he encountered two additional moves named 'Limitation' and 'Finding'. The former is connected to the limitations of some findings, limitations of the methodology adopted, or the claims made, whereas the latter move is similar in function to the 'Statement of Result' except for the fact that the 'Finding' move does not refer to figures or visuals but rather to 'an observation arising from the research' (p. 225). Added to this, in the current analysis, the researcher combines the two moves of his (1986) work referred to as 'Hypothesis' and 'Deduction' into a new move termed 'Claim'.

Using a similar approach to Swales' revised model, Peng (1987) proposed the following 10- move system for the analysis of the Discussion sections of chemical engineering RAs:

0. 'Information', 1. 'Statement of Results', 2. 'Observation', 3. 'Comparison', 4. 'Expected Outcome', 5. 'Explanation', 6. 'Deduction', 7. 'Hypothesis', 8. 'Justification', 9. 'Validation', and 10. 'Recommendation'. Her results indicate that the Discussion sections include most of Dudley-Evans (1986, 1994), and Hopkins and Dudley-Evans' (1988) proposed moves and generally exhibit the same order. These moves tend to occur in cycles. Long cycles consist of series of sub-cycles, each of which is headed by Move 1. Concerning the frequency of occurrence of moves, the researcher found that Move 1 appears to be quasi-obligatory, occurring generally as the head of each cycle.

Peng believes that the structure of the Discussion section is less predictable than that of the Introduction section due to the fact that she encountered variations in the structure of this particular section. For example, she noticed that some Discussion sections seem to conform to Belanger's (1982) proposed structure of neuroscience RA Discussion sections, while others, such as short communication papers, appear to conform to Hill *et al.*'s (1982) proposed macrostructure. The researcher attributed this to the fact that these short communication Discussion sections only present results without further implications. On the other hand, in the Discussion sections of normal length, Belanger (*ibid.*) noticed that the authors begin their argument with a specific problem, go on to another and proceed in this way until adequate evidence is provided.

Based on the move analyses listed by Peng (1987), and Hopkins and Dudley-Evans (1988), Najjar (1990: 170- 172) found that the integrated Results and Discussion section and the separate Discussion section of agriculture RAs in Arabic tend to have the following rhetorical structure: 1. 'Background information', 2. 'Statement of result', 3. 'Reference to previous research for comparison', 4. 'Reference to previous research for support', 5. 'Deduction', 6. 'Hypothesis', 7. 'Method', 8. 'Expected outcome', 9. 'Conclusions and recommendations'.

These Results and Discussion sections tend to have a pattern of organisation similar to that proposed by the above-mentioned researchers in terms of number and type of moves that appear in this section and in regard to the cyclical organisation of this particular section.

These results are based on the assumption that the separate Discussion section and the coalesced Results and Discussion sections have the same function. 'Apparently, the only major difference between the separate discussion section and RD section is that in the latter all the results of the study are presented, while in the former only a selected number are presented' (*ibid.*: 177). However, the researcher did not point out whether he conducted different types of analyses; one carried out for those RAs which have Result sections, another to show the structure of the combined Results and Discussion sections; and a third taking into account the rhetorical structure of the Discussion sections separately.

Skelton (1994) recognised four moves that tend to occur throughout the Discussion sections of 50 RAs selected from *British Journal of General Practice*. These moves represent Move 12, Move 13, Move 14, and Move 15 in the rhetorical structure of the

whole body of the medical RAs, which contain 15 moves. They can be categorised as follows:

Move 12: limitations and defended success often indicated by lexical exponents such as 'caution', 'limitation', 'justification', 'excellent', and 'successful'.

Move 13: Achievement of the study - As mentioned by the researcher, this move tends to be signalled by lexical items such as 'demonstrate', and 'show'. This move indicates whether the researcher has achieved the overall purpose (i.e. 'Move 4' stated earlier in the RA Introduction).

Move 14: Contextualising the findings of the present study in the relevant past research. This move is realised by reference to previous research for comparison, or support which is, in turn, a mirror image of Swales' (1981) Move 2, reference to past research.

Move 15: Recommendations

As indicated by the researcher, Move 13 and Move 14 of the Discussion sections reflect the fourth and the second moves of the Introduction sections respectively. Thus, the structure of these Discussion sections proceeds from the achievement of the purpose of the study to the wider implications and recommendations of results which are interpreted by members of the academic community as an appeal for further research to be carried out. Accordingly, it is of interest to note that the structure of these RAs apparently fits Hill *et al.*'s (1982) proposed model.

As mentioned earlier, Nwogu (1997) based his analysis of medical RAs on Swales' (1990) model. The researcher suggests the following three moves as constituent elements of the Discussion section of medical RAs. These moves stand for Move 9, Move 10, and Move 11. They tend to appear at the end of the RA structure which usually consists of 11 moves.

'Move 9: Highlighting Overall Research Outcome': This move either confirms or refutes the current research aim.

Move 10: 'Explaining Specific Research Outcomes': This move consists of the following elements:

- (1) 'Stating a specific outcome' indicated by the use of past passive verb forms,
- (2) 'Interpreting the outcome' by the use of explicit words or phrases,
- (3) 'Indicating significance of the outcome',
- (4) 'Contrasting present and previous outcomes'
- (5) 'Indicating limitations of outcomes' signalled by explicit lexemes or negative verb forms.

Move 11: 'Stating Research Conclusions' by

- (1) 'Indicating research implications',
 - (2) 'Prompting further research'
- (Nwogu, 1997: 153)

The present results concerning the number and the type of moves that tend to occur in the Discussion section reported by Nwogu show some resemblance to those presented by Peng (1987), Hopkins and Dudley-Evans (1988), Dudley-Evans (1986, 1994) and Najjar (1990). However, these moves are more generalised. Yet, the constituent steps of these three generalised moves bear resemblance in function to the moves proposed by the aforementioned genre analysts. We need to add that the author has not dealt with the frequency of occurrence of these moves and how a RA writer develops his argument either in cycles or in linear patterns.

Holmes (1997) carried out a genre analysis, based on Hopkins and Dudley-Evans' (1988) model, on 30 articles selected from sociology, political sciences and history. His aim was to find out how far Dudley-Evans' model, when applied to the Discussion sections of natural sciences, can be generalised to other academic disciplines. Holmes (1997: 324- 25) identified the following list of moves that were found to occur in the Discussion sections of the corpus selected for analysis: 'Background Information', 'Statement of Result', '(Un)expected Outcome', 'Reference to Previous Research', 'Explanation of Unsatisfactory Result', 'Generalization', 'Recommendation', 'Outlining Parallel or Subsequent Developments' .

However, considerable variations were noticed concerning the RA's rhetorical organisation and the move structure of the Discussion sections within a discipline as well as across disciplines examined. For example, in terms of variations at the level of the RA organisation, the researcher found that history RAs did not have Methods sections. On the move structure level of the Discussion sections, there were noticeable disciplinary differences in the type, number, and sequence of moves, as well as move cycles included in the Discussion sections within a discipline and across disciplines.

Posteguillo (1999), in a genre analysis of 40 RAs of computer sciences, found that only 34 including *Discussion/Conclusion* sections. The author employed Swales' (1990: 172- 173) list of moves which is adapted from Hopkins and Dudley-Evans (1988) as a major reference. Comparing his move analysis of the *Discussion/Conclusion* sections with the list of moves of the above-mentioned writers, Posteguillo reports that computer science RA writers commonly use the *Statement of results* and *Recommendation for further research* moves to build up this particular section.

Contrary to Swales' view, which considers reference to previous research to be the most frequently used move across disciplines, computer RA writers tend to make less frequent reference to previous research. Concerning the other moves proposed by

Swales, they occur with less frequency, a tendency, 'which is in line with Swales' opinion about their optional nature' (p. 156).

A tabulation of the move analysis studies carried out by the various researchers is presented below:

Table 3.4 Overview of the move-structure of the RA Discussion sections

Authors Move-structure	Dudley- Evans (1986)	Peng (1987)	Hopkins &Dudley Evans (1988)	Dudley -Evans (1994)	Najjar (1990)	Skelton (1994)	Holmes (1997)	Nwogu (1997)	Posteg- uillo (1999)
Information move	+	+	+	+	+		+		+
Statement of result	+	+	+	+	+		+		+
Finding/Observation	-	+	-	+	-	-	-		-
(Un)expected outcome	+	+	+	+	+		+		+
Reference to previous research (comparison)	+	+	+	+	+	+	+	+	+
Reference to previous Research (support)	+	+	+	+	+	+	+	+	+
Explanation	+	+	+	+	-	-	+	+	+
Problems with results Or (Validation)	+	+		-					
Hypothesis	+	+	+	+	+	-	-	-	+
Exemplification	-	-	+	-	-	-	-	-	+
Deduction	+	+	+	+	+	-	-	-	+
Recommendation	+	+	+	+	+	+	+	+	+
Justification	-	+	+	-	-		-	-	+
Evaluation of method	+	-	-	+	-	-	-	-	-
Method	-	-	-	-	+	-	-	-	-
Indicating limitations				+		+		+	
Stating research Conclusions (implications)				-				+	
Highlighting overall Research outcome	-	-	-	-	-	+	-	+	-
Generalisation	-	-	-	-	-	-	+		-
Outlining parallel or Subsequent developments	-	-	-	-	-	-	+	-	-

3.5. Concluding Remarks

In this chapter we have attempted a review of the literature pertinent to the RA rhetorical organisation sections (Introduction, Methods, Results, and Discussion), in terms of the rhetorical functions of each section and the linguistic exponents used to realise some of these functions. The review has indicated that there is some evidence to support co-occurrence of some linguistic components characterising the moves constituting each RA division. In addition, there appeared to be some linguistic features functioning to signal the communicative functions of the RA rhetorical sections. In

other word, the 'bottom-up' analysis in some way supports the 'top-down' analysis. Also, a major emphasis has been laid on reviewing the studies that have considered the organising moves of these sections and the linguistic components often used to signal these moves. The investigation revealed that genre analysts have adopted Swales' CARS model in the analysis of the RA Introduction sections selected from various disciplines. However, Dudley-Evans has adapted the model to analyse the Introductions of related sub-genres such as MSc dissertations. It is also extended to the analysis of the RA and dissertation Discussion sections. Adopting Swales' model, Skelton (1994), Nwogu (1997), Holmes (1997), and Posteguillo (1999) have developed a similar framework to analyse all the rhetorical divisions of the RA.

As a result of the studies reviewed, we recognised that the rhetorical move structure of the Introduction section is more predictable than those of the other sections. However, very slight variations were noticed regarding the number and type of moves included in the Introduction sections across disciplines. For example, Crookes noticed the occurrence of other moves not documented by Swales' model such as 'presenting general, non-referenced theoretical background' (Crookes, 1986: 67). By and large, the results of the reviewed literature seem to support the plausibility of the CARS model when applied to the Introduction sections.

In comparison with the huge literature concentrated on the Introduction sections, very little genre analysis has focused on the Methods and the Discussion sections. This is perhaps, due to Swales (1981, 1990); Peng (1987); and Salager-Meyer's (1994) assumption that the organisation structure of these sections is straightforward. It is read and written like a checklist. Nonetheless, Swales (1990) says that disciplinary variations may lie more in the Methods and Results sections. Brett's (1994) analysis of the sociology Results sections, for example, confirmed Swales' suspicion concerning these sections. He found communicative categories not recognised as previously appearing either in Hopkins and Dudley-Evan's (1988) model of the RA Discussion, or suggested by Weissberg and Buker's (1990) model for the Results. On the other hand, it appears that the sociology RA Results section is multifunctional and constitutes the core of the RA, to the extent that the Discussion sections of these RAs come up to reveal periphery functions, such as summarising and providing implications for further research.

Concerning the studies that have examined the Discussion sections which were generally based on Hopkins and Dudley-Evans' (1988) model, we find that the Discussions of RAs from various disciplines generally share similar rhetorical moves,

though RA writers have used different nomenclature, and sometimes differed on the level of generality of the moves proposed. Also, some disciplinary variations were found especially with respect to sociological science RAs. There were considerable disciplinary variations especially within the various disciplines of social sciences, concerning the number, type and sequence of moves included in the Discussion sections. Furthermore, some Discussion sections within the RAs of the same discipline may display various rhetorical structures. Disciplinary variations have led Dudley-Evans (1993) to conclude that 'An approach to the teaching of academic writing that implies that there are common patterns of organisation that always apply in all disciplines is,..., dangerously misleading' (p.147).

However, a number of comments can be made about the studies reviewed. First, very scant attention has been paid to the analysis of the Methods and the Results sections either within a single discipline or across disciplines. Second, only three attempts have been made to apply Swales' CARS model to all the rhetorical divisions of the RA within a single discipline, that is medical research papers; yet, one of those three attempts, as described by Nwogu (1997: 20), 'is intended for a non-specialist audience - general medical practitioners'.

The third observation is that a number of the reviewed studies have recommended further research on issues such as: i) to what extent the overall rhetorical structure of a research article, or particular sections of the RA of various disciplines show evidence of disciplinary variations or consistency; ii) how far the generic model promoted by Swales can be generalised to all RAs across various written disciplines; and iii) how far the register pressure, especially in terms of a field's demands, constrains the rhetorical structure of discipline specific genres. The increase in pedagogical implications and demand for extending genre analysis to other RA sections and/or to the RA's overall structure across disciplines constitute the rationale of the present research. For example, Brett (1994) points out that 'the pedagogic genre analyst should not readily accept models based on analyses of disparate disciplines' (p.57).

The fourth issue that emerged is that some of the genre analysts, such as Swales (1981) and Crookes (1986) decided to exclude theoretical RAs or those which are not experimental or data based in their analyses. Other researchers have avoided including statistics or maths RAs. Such constraints on data inclusion or exclusion limit the

generalisability of their conclusions because the quantificatory nature of theoretical RAs may entail a different set of communicative purposes and hence a different rhetorical RA structure is required.

One more significant observation is that no study has attempted a bottom-up and a top-down analysis of all the rhetorical sections of the RA across various disciplines to find out how far Swales' model of genre analysis can be construed as a cross-disciplinary model distinct from register. Such an attempt is needed to examine claims voiced by some genre analysts such as Bhatia (1993: 199) who argues that subject disciplinary variations do not significantly affect generic integrity.

The last but not the least observation is that no attempt has been made so far aiming at exploring the RA writers' consciousness of the schematic generic structure of the whole RA in terms of the rhetorical divisions and the internal structuring moves constituting these sections in the process of writing.

The above-mentioned observations and the open questions raised establish the rationale for the purpose of the present thesis. To this end a cross-disciplinary RA corpus is required to find out how far genre analysis could be construed as a cross-disciplinary construct. Further more, no study has related genre to authorial consciousness of the text's generic structures. As mentioned earlier towards the very end of Chapter 2, this study attempts to carry out a genre text analysis of RAs selected from various disciplines and to approach the writers of the same RAs to come up with an idea about their consciousness of generic knowledge conventions in the process of writing.

4. Methodology

4.0. Introduction

As mentioned earlier in Chapter 3, only very few studies have extended Swales' (1990) model of genre analysis of the research article (RA) Introduction sections to describe the whole body of the RA of a particular discipline. Similarly, none has attempted applying a generic move analysis to a corpus consisting of entire RAs selected from different disciplines to find out how far generic models can be generalised across written academic discourse. More notably, the literature review has revealed that there have been very few studies about the extent to which experienced RA writers are actually conscious of such models in the process of writing.

Therefore, to meet the requirements of this study, I needed to have access to both the RA authors and their genre production. The qualitative data obtained from the RA writers concerning a possibility of a shared generic knowledge among them may supplement the results of the generic text analysis.

The purposes of our research are threefold: First, I will investigate how far Swales (1990) and Bhatia's (1993) notion of genre can be generalised across disciplines by carrying out a generic move analysis upon an RA corpus selected from different disciplines. Second, I will try to find out how far the RA writers of the same analysed texts are conscious of the RA genre structure in the process of writing and whether there are indications of a shared schematic knowledge among these writers. Third, I attempt to elicit a sense of what composing practices these experienced writers actually adopt in the process of writing to produce successful RA texts.

To achieve the above-mentioned objectives, I needed to choose accurate research tools. As Morrison (1993) noted, the choice of data gathering instruments is 'not arbitrary but determined by the appropriacy of the instrument to the purpose' (p.59). Similarly, Brannen (1992: 5) and Welch and Comer (1983: 2) pointed out that the outcome of a research project is highly influenced by the accuracy with which the research tools are selected.

The purpose of the present chapter is to show the appropriacy of our selection of methods in relation to the objectives of our research. We will present, justify, and

discuss the methodology of data collecting, selection of participants and texts, as well as the methodology followed for analysing the qualitative data and the texts selected for the present research.

4.1. Choice of Specific Techniques

As said, the choice of a particular technique is driven by the suitability of that technique to the collection of data that fulfil the research objectives, on the one hand, and by the validity, feasibility and effectiveness of that particular tool for gathering adequate data in a short time span.

Since the first objective of this study is to find out how far RA generic move model could be generalised across academic disciplines, I carried out a generic move analysis procedure on the basis of that proposed by Swales (1990) on a corpus of RAs selected from various disciplines. To elicit a sense of the RA writers' consciousness of genre structure and a sense of the composing techniques writers make use of in the process of writing, I conducted qualitative interviews with the same RA writers whose texts were also subjected to the move structure analysis. First, let us consider the techniques of data collection so as to choose a suitable tool for eliciting qualitative data from the RA writers whose texts will also be subjected to analysis. The latter part of this chapter describes the text analysis framework of the RA rhetorical structure, principally using Swales' (1990) CARS model.

4.1.1. Interviews

Some of the means through which data can be elicited are interviews and questionnaires. Each has advantages and disadvantages. In this study, the interviews have been adopted as the main means of data collection. Nachmias and Nachmias (1987) define the personal interview as 'a face- to- face interpersonal role situation in which an interviewer asks respondents questions designed to obtain answers pertinent to the research hypotheses. The questions, their wording, and their sequence define the extent to which the interview is structured' (p. 26). This definition implies that there are different kinds of interviews. The type of data to be collected determines the specific interview type to be employed.

In what follows, I will present the rationale behind the choice of the interviews as a data collection technique rather than the questionnaire. Then I will draw a comparison

between the different kinds of interviews to justify the choice of 'semi-structured' interview as the most appropriate instrument.

The questionnaire is an accurate and fairly objective method, capable of eliciting data about a large population in a short time. This is because it lends itself easily to machine analysis. Its main problem is that there is no direct interaction between the interviewer and the respondent. Thus, neither of them can ask about further obscure issues or pursue points which were not predicted, whereas with regard to interviews,

'the interviewer asks certain, major questions the same way each time, but is free to alter their sequence and to probe for more information. The interviewer is thus able to adapt the research instrument to the level of comprehension and articulacy of the respondent, and to handle the fact that in responding to a question, people often also provide answers to questions we were going to ask later' (Fielding, 1993: 136).

As is indicated above, the interview as a research method has many advantages over the questionnaire. It offers an opportunity of interaction between the interviewer and the respondent whereby it is possible for the respondent to ask for clarifications of vague questions and for the interviewer to clear up obscurities and ask for further information.

The rationale behind the decision to use the interview as a research tool, rather than the questionnaire, lies in the nature of data to be elicited. This part of the study is about how far RA writers make conscious use of generic models in the process of writing and what composing strategies they adopt in the process of writing to produce successful research articles. This means that the participants will give subjective accounts of the RA writing process. In this respect the appropriacy of interviews as a research technique seems to be evident. They are much better tools for eliciting subjective meanings than questionnaires, because of the flexibility of the interview as a means of exploring subjective meanings. Banitser *et al.* (1994) attribute the preference for conducting interviews rather than administering a questionnaire to the reasons that the researcher is concerned 'with subjective meanings... rather than with eliciting responses within a standard format for comparison with other individuals or groups.... [and that] interviews can permit explanation of issues that may be too complex to investigate through quantitative means' (p. 50). They further add that 'the views of the participants can not be readily representable within that form, [questionnaire]' (ibid.). Furthermore, Tuckman (1972) says, the interview as a research technique tends to provide 'access to what is "inside a person's head"', [it] makes it possible to measure what a person knows

(knowledge or information)...and what a person thinks', (quoted in Cohen and Manion, 1994: 272).

4.1.2. Choice of Specific Kind of Interviews

Different kinds of interviews have been outlined and contrasted such as structured, semi-structured and unstructured interviews (Cohen and Manion, 1994; Bansiter *et al.*, 1994 and Hitchcock and Hughes, 1995). However, the nature of the area investigated and the objectives of the interviewer are considered as determinant factors in choosing the type of the interview.

I attempt, first, to highlight some of the differences between the three kinds of interviews. Then, I will present what the 'semi-structured' interview, as a data collection tool, is likely to reveal. This revelation in turn guides the choice of this particular technique rather than the 'structured' or unstructured' interview types.

The differences between these types of interviews, according to Hitchcock and Hughes (1995), lie in 'the nature of the questions asked, the degree of control over the interview exercised by the interviewer, the numbers of people involved...' (p. 153).

The structured interview is organised around a constructed schedule made of fixed alternative items which can be easily categorised, coded and analysed (Cohen and Manion, 1994). In a structured interview, the interviewer attends the interview equipped with a prearranged sequenced and carefully worded list of questions. These questions are characterised by being short, direct and capable of eliciting immediate responses. These characteristics reveal that this type of interview bears some resemblance to questionnaires in that the schedule of questions is fairly rigid. 'The same questions are presented in the same manner and order to each subject and the choice of alternative answer is restricted to a predetermined list' (Van Dalen, 1972: 330). Another shortcoming is that 'it is not always possible to specify in advance what questions are appropriate or even important...social meanings are complex and not unequivocally revealed by a dictionary-like translation of "responses" to prearranged "questions"', (Hitchcock and Hughes 1995: 159).

Unstructured Interviews, on the other hand, attempt to provide a record of the free flow of deeper and meaningful information from those being interviewed in an open situation. They are concerned with eliciting subjective information by exploring issues that seem to be too complex to investigate by administering a structured ordered list of

questions. Palmer (1928: 171), cited by Burgess (1982), indicates that the unstructured interview 'assumes the appearance of natural interesting conversation. But to the proficient interviewer it is always a controlled conversation which he guides and bends to the service of his research interest', (quoted by Hichcock and Hughes (1995: 163).

Within the unstructured interview, there is an assumption that such a research tool may end up with negative effects due to the creeping in of bias through subjectivity, which in turn affects the accuracy of the elicited data. For example, the interviewer may ask leading questions to elicit the kind of data, which supports a certain point of view, or the respondent may lead the interview and travels wherever he likes moving far away from the kinds of areas the interviewer wants to investigate.

Our study is related to a specific objective. As the objective is to elicit information from RA writers on their consciousness of the RA generic model as it impinges upon the process of writing, I therefore came to the interview with a list of questions in mind. Thus, in the interview, I needed to focus on the list I thought of so as to minimise digression on the part of the respondent and to elicit responses relevant to the specificity of the intent of the questions being prepared.

In the present study, we come to employ a semi-structured interview that is a hybrid of the structured and the unstructured interviews. Banister *et al.* (1994) point out that this type of interview has the advantage that 'you can tailor your questions to the position and comments of your interviewee' (p. 51). That is to say, it is possible to penetrate behind the respondents' initial answers, extend them and 'follow up issues raised by your interviewee, including ones that you may not have anticipated' (ibid: 51). Likewise, 'some kind of balance between the interviewer and the interviewee can develop which can provide room for negotiation, discussion, expansion of interviewee's responses' (Hitchcock and Hughes, 1995: 157). To sum up, the wording and the sequence of the prepared questions may be changed and further questions, comments and notes may be added as far as further issues revealed.

The questions of the interview schedule were mostly of the semi-structured and open-ended nature. The rationale behind this is that semi-structured questions are phrased to allow for individual responses having no choices from which the respondent selects an answer. They are normally open questions, and fairly specific in their intent (McMillan and Schumach, 1989: 40). Open-ended questions also 'enable the interviewer to test the limits of the respondent's knowledge; they encourage co-operation and help establish

rapport; and they allow the interviewer to make a truer assessment of what the respondent really believes' (Cohen and Manion, 1994: 277).

However, this type of interview is not without shortcomings. For example, the presence of the interviewer may affect the responses he obtains; sometimes the respondent gives false answers to please the interviewer. 'The interactions between the respondent and the interviewer are subject to bias from many resources. Eagerness of the respondent to please the interviewer... may contribute to biasing of data obtained from the interview' (Borg, 1981: 87).

To improve the quality of elicited data and to minimise the sense of bias as much as possible, Asabab (1992), Goetz and LeCompte (1984) and other researchers suggested a set of precautions and recommendations including:

1. the researchers should prepare themselves in advance by reading as much as they can about the interview questions they are going to ask;
2. the researchers should prepare all the questions related to the objectives of the study before hand to be adhered to in each interview;
3. the researchers should discuss the task with as many different experienced researchers as possible in different institutions; and
4. the informants should be carefully chosen in terms of special experience, knowledge, status and willingness to participate and share their knowledge.

The interview instrument for the present study was developed with these recommendations and others in mind.

4.2. Data Collection

As is said, the choice of semi-structured interview as a research instrument is related to the specificity of the objectives of the study; that is to elicit information on the RA writers' consciousness of Swales' generic models. This research tool ties up with and complements the objective of the other research method, RA genre text analysis, which also attempts to find out how far Swales' generic model is reflected in the RA writers' texts.

The aim of this section is to describe how the semi-structured interview as a data collection technique is implemented in terms of what questions were asked and who was asked, and on what criteria the participants were selected.

Thus, the structure of the present section will proceed as follows. First, it opens with a description of the processes the researcher had gone into before he decided on the content of the qualitative interview questions. The structure and content of questions will also be presented. We then provide a brief discussion on the interview questions' validity and reliability. Indications of the criteria of participants' selection will follow. Finally the section is closed with a brief account of how the fieldwork was conducted.

4.2.1. Deduction of the Interview Questions: Preliminary Discussions

Before embarking on an interview, the interviewer should be familiar with the technicalities of the area under investigation to convey the impression of an informed researcher who is able to understand the answers to the informants' questions. S/He should also think of what questions to ask, how far these questions cover the area researched, and who to ask.

To prepare a handful of questions in order to conduct a semi-structured interview, I have carried out considerable background work including reviewing previous literature pertinent to the analysis of the RA rhetorical structure across various disciplines, and have done some preliminary interviewing with RA writers from different fields.

It is evident in the literature review section that I have reviewed the studies that have dealt with the analysis of the Introduction, Methods, Results, and the Discussion sections of the RA and the rhetorical moves included in each section. What I have learnt from this section has helped to formulate a substantial knowledge of the RA's generic conventions, and the constituent rhetorical moves and communicative functions that tend to occur in each RA section. From this preliminary investigation, I learned about the broader issues concerning the organisation of the RA, which in turn helped to shape the type of the main questions to be asked in the qualitative semi-structured interviews.

However, I was not sure whether these questions would be applicable to interviewees from various disciplines. For example, I was not sure whether all RA writers follow the same IMRD pattern in organising their RAs, or whether this pattern is employed in the organisation of both the theoretical and empirical RAs. To gain information about such issues, I did some preliminary interviewing with RA writers from various fields. I located RA writers without difficulty and set up appointments with them for preliminary interviews. Beforehand, I prepared questions to ask writers about the RA conventions and organisational structure to formulate a preliminary idea as to whether RA structure

varies across disciplines. Besides, I was also able to get an idea about the most active researchers in each field who might be willing and could contribute to the subject under investigation.

4.2.2. Interview Questions: Structure and Content

On the bases of the literature review and the preliminary informal interviews, I was able to obtain an overall picture and formulate a matrix of questions, the answers to which give insights into the topics investigated, and direct the discussion.

It is worth pointing out that a qualitative project can be problematic if the researcher intends to prove a specific hypothesis, which risks the conscious manipulation of data towards a particular end and that in turn enhances the interviewer's subjectivity. However, this did not apply to the present research because the interviews were conducted in a frame of an opening enquiry and without any conception on the part of the researcher of what would be revealed. The open-ended nature of the interview questions helps the researcher to elicit data that is not manipulated towards a given end. More important is the fact that I did not set out to prove or formulate a hypothesis. My main objective was to elicit answers to open-ended questions.

The interviews were structured around the constituent elements of the topics investigated. These questions were divided into four parts, each of which centred on a particular purpose.

1. General questions: In this part, the participants were asked to provide information regarding their speciality, position, experience, number of published articles, and the standards of the journals they publish in. The importance of this section stems from the fact that it provides a background about the participants' experience and number of publications.
2. Consciousness of RA generic model at the section and move structure levels: The questions centred on the organisational structure of the RA and the separate sections that go together to form the overall structure of the RA. The purpose of this section is to elicit information from the participants about the type and sequence of sections and the constituent moves of each section they employ in the process of writing their RAs. This section complements the objectives of the text analysis research instrument which aims to find out how far Swales' notion of a generic model is reflected in the writer's RA texts.

3. Composing practices: The questions in this section pointed to the writing strategies that writers make use of to produce successful RAs in the process of writing. Other questions are related to RA writing practices and co-operative writing. Interesting in themselves, particularly for a pedagogically motivated study, are composing practices. They may also give an indication of how RA generic structures are stored at the schematic level. They will do this by indicating ways in which writers access their mentally stored structures and the order in which they do so.
4. Evaluation of RA generic text analysis: This is a one question part in which the participants were asked to voice their views and comments regarding what our RA text analysis suggests to them as RA writers. It is worth noting that this part is conducted subsequently as a part of 'text analysis validation section' when we cross-checked our analysis of the RA texts with the same RA writers to give it greater validity.

Added to the main questions, I prepared prompts to encourage the interviewee to start talking or to give him/her an idea on occasions when s/he asks for further illustration or exemplification of a specific question. However, the respondents might reject these signposts completely and give their own points of view.

4.2.3. Interview Questions: Validity and Reliability

Before conducting the interviews, the researcher prepared typed drafts of the list of the main questions and handed them to four expert RA writers. The panel was chosen as follows: two were from the University of Durham, one of them being my supervisor and the other a professor in the School of Education. The other two teach research methods at Jordanian universities. I sat with each of them and informed them about the nature of the study and invited them to provide comments and suggestions as to the organisation and content of the list of questions. All commented on the list and provided suggestions for improving the various aspects of these questions. A few questions had to be rephrased and others had to be deleted. All these problems were avoided in the final version. (See Appendix II. A Semi-structured Interview).

4.2.4. Criteria for the Selection of Interview Participants

According to Goetz and LeCompte (1984: 120), the ideal interview participant is the informant who meets the criteria of being an individual with special knowledge,

communicative skills, status, and willingness to contribute to the present research. On the other hand, Rymer (1988) puts forward three defining criteria for an expert scientist: 'prestigious publication records, high citation indexes, and extensive experience training graduate students' (p. 215). Other researchers, such as Pindi (1988), emphasise the importance of participants' accessibility as a criterion to be taken into consideration. 'This is a privilege that cannot be overlooked in this world of extremely busy and time-conscious professionals' (p. 97).

With the above-mentioned criteria in mind, I decided to select participants who meet the following criteria:

1. having numerous publications in English in international prestigious indexed and refereed journals,
2. willingness to participate and communicate their knowledge as specialist informants in the subject under investigation,
3. accessibility,
4. experience either in supervising graduate students, teaching research conventions, or in reviewing RAs published in prestigious journals. This criterion is based on the assumption that someone with this experience will be more conscious of the RA texts' generic structures.
5. variation in specialities, and being a non-native speaker. There will be an account of why the selection of the participants is restricted to non-native speakers later.

4.2.5. Composition of the Panel of Participants

Concerning participants' accessibility, 16 non-native RA writers expressed their willingness to avail themselves as specialist informants and participate in this interview. This number is a fairly good representation of a variety of disciplines. All of the respondents graduated from British or American universities. All are Ph.D. holders and have published a considerable number of RAs. Most of them have published over 20 RAs in international, primary indexed and refereed journals written in English. Most of them are heads of universities' departments and/or on committees of scientific research, and have supervised graduate students. Three of them act as faculty deans. Ten of the sixteen members have experience in refereeing RAs in primary journals.

The question, which arises here, is why the selection of the participants is restricted to non-native speakers. At the first glance, restricting the selection of the participants to non-native RA writers may give rise to the problem that our conclusions are limited in their generalisability by this somewhat inappropriate selection of participants and corpus texts. In other words, our selection of both the participants and the texts may appear to be open to the criticism in that it remains in the end based on the responses of non-native speakers and on their English RAs written texts. However, it will be shown that the exclusion of native participants is in a way justified. We may argue that the present research is only concerned with interviewing authors who produce original research published in international, indexed and refereed journals. Thus, this type of genre is addressed to a very narrow and specific audience. This specificity is not based on place of birth but on commonality of purpose of those specialists in the field, and who share common background and presupposed knowledge irrespective of place of birth and proximity. In this respect, Widdowson (1979) points out that ‘it is widely recognised that scientific research methods have a universal core independent of cultural values’, (quoted in Najjar (1990: 66-7). Furthermore, RA writers should maintain the set of style prescriptions, format, and organisational patterns shared by the members of the discipline specific community. In other words, a genre should be invariably maintained whether a RA writer is native or non-native in order to operate in a manner acceptable to the members of the academic specific community. As mentioned earlier in Chapter 2, membership of this community, according to Swales (1990), is based on *sociorhetorical* groupings. Members of this community, especially those who share similar knowledge and who have the interest and need to exchange ideas, ‘are likely to communicate with other members in distant places and are more likely to respond to writings’ (ibid: 24) regardless of their culture, place of birth, locality or proximity. Additionally, English RAs written by non-natives will not be published unless they are of high quality and meet the conventions agreed upon either implicitly or explicitly by the members and the gatekeepers of the field specific academic community. For example, the instruction to authors of certain journals state explicitly that RAs must be written in fluent English and that English of low quality is a major cause of rejection. Moreover, it is difficult to differentiate in the selection between those RAs written by natives or non-natives because, according to Swales (1990), more than half of the RAs have been written by scholars who do not have English as a first language.

Another significant reason is that the pedagogical implications, which may be drawn from this piece of research, will be applied to non-natives to aid writing and reading skills. Thus, when learners are exposed to successful exemplars of English RA texts written by non-natives, it is easier to convince them that they too can be capable of producing similar texts.

Each of the participants has to meet the requirements of publishing in these prestigious journals. In addition, each has numerous English publications in international primary, indexed and refereed journals. Most of them have experienced either supervising graduate students, teaching research conventions, or reviewing and refereeing RAs published in journals. Therefore there is no convincing reason to differentiate between native and non-native speaking members.

The following table shows the interview participants by name, speciality and experience:

Table 4.1 Summary of interviewees' speciality and experience

RA Writer	Speciality	No. of Ras Published in Indexed & Refereed Journals	Position	Academic and Research experience
Abd al-Aziz Duri	History	So many. I don't know	-Dean of Faculty of Arts 1960	-Extensive post doctoral experience for over than 45 years -Supervised many PhD students
Abdulrahman I. Tamimi	Chemical Engineering	28	-Dean of Scientific Research- JUST University- Jordan -Chairman, Chem. Engineering Dept.	-Assistant Prof. (1986) -Professor (1995- Present) -Reviewer of RAs Submitted to: <i>Industrial and Engineering Chemistry Research Journal</i> -Supervised many MSc. Theses
Ahmad S. Alkofahi	Pharma-cognosy	33	-Acting Dean Faculty of Pharmacy -Chairman of Pharmacognosy JUST Univ.	-Assistant Prof. (1984) -Professor (1997- Present) -Reviewer of RAs submitted to <i>Intr. J. of Pharmacognosy</i> -Supervised many MSc. Theses
Abid M. Elabdalla	Electrical Engineering & Computer	21	-Assistant Dean of Engineering -Chairman of Electrical Engin. JUST Univ.	-Assistant Prof. (1980) -Associate Prof. (1989) -Supervised many MSc. Theses
Ehab Malkawi	Pure Physics	8	JUST Univ.	Assistant Prof. (1996)
A. Nusayr	Applied Maths	15	-Dean of Faculty of Science Al- Albait Univ.	-Assistant Prof. (1969) -Professor (1989- Present) -Supervised many MSc. Theses
Adnan M. Shaiah	Applied Physics	15	JUST Univ.	Assistant Prof. (1990)
Azhar S. Daoud	Pediatrics	52	-Chairman of Dept. of Pediatrics JUST Univ.	FRCP (1987) -Professor (1997- Present) -Reviewer
Basel M. Al-Eideh	Statistics	15	Chairman Dept. of Math. Sciences JUST Univ.	Assistant Professor (1992)
Fayyad Algodah	Banking Law	5	Jordan University	Assistant Professor (199?)
Kamal Gharaibeh	Surgery	15	JUST Univ.	FRCS (1984) Associate Prof. (1995- Present)
Mashhour I. Mohamed	Algebra	34	Chairman Dept. of Math. Sciences Muta University	Assistant Prof. (1985) Professor (1996)
Mohamed M. Al-Abdallah	Chemistry	25	Chairman Dept. of Chemistry Yarmouk Univ.	Assistant Professor (1985) Professor (1996- Present) Supervised many MSc. Theses
Rowaidah Al-Ma'aitah	Nursing	14	Dean of Faculty of Nursing JUST Univ.	Assistant professor (1986) Associate Prof. (1995- Present) Supervised many MSc. Theses
Saleh Al-Hussien	Anatomy	6	Chairman of the Dept. of Anatomy JUST Univ.	Assistant Professor (1989) Associate. Prof. (1995- Present)
Zuhair S. Amr	Zoology	58	JUST Univ.	Assistant Professor (1990) Associate Prof. (1996- Present) Reviewer Supervised many MSc. Theses

4.2.6. Conducting the Field Work

As is said earlier, I reviewed items of previous literature pertinent to the present study, and conducted preliminary informal interviews with specialists from various fields. After refining the research questions of the qualitative interview with a panel of experts, I decided to start collecting qualitative data. This sub-section aims to explain the steps taken by the researcher during the field work process of the study.

For reasons of ease of access, most of the interviews were conducted within JUST University in Jordan. The necessary cross-section of disciplines is in a way represented there. Prior to conducting the research, I informed the dean of the faculty of science and arts about the purpose of my study. A letter authorising access to the participants was received from the dean in order to ensure that the research did not contravene the policy of the institution. Apart from this, ethical issues did not arise, as the interviewees are adults and gave access and co-operation freely. Co-operation was a conscious decision on the part of the interviewees.

The researcher made contact with the heads of the departments to know which interviewees are most knowledgeable, active in RAs written in English. Later on, the researcher arranged appointments with those potential respondents who expressed their readiness and willingness to participate in the interviews.

The interviews were structured around the constituent elements of the investigated topics and appeared as questions, most of which were open ended, and worded in such a way that could help the RA writer to talk for a length of time. However, during the interviews, we had the opportunity to ask follow up questions for further clarifications or exemplification. All the respondents opted to speak in English during the interviews. The interviews took place in a relaxed atmosphere. Whenever any interviewee was busy, or tried to set a limit for the interview, we set up a follow-up appointment so as to allow enough time to cover the same ground with everybody. The interviews were conducted by the researcher himself.

Although the presence of the researcher may affect the participants' responses, as mentioned earlier, this was not considered as a problem because cultural issues of status helped to eliminate research bias as the researcher is considered of less academic status and therefore less likely to elicit replies that would be calculated only to please him. Moreover, being RA writers, all of the respondents know the effect of subjectivity as a source of bias on the final outcome of scientific research.

The interviews were tape recorded upon the participants' approval. These interviews were broadly transcribed immediately after each meeting. The whole of the interviews could not be presented here due to their excessive length. Those parts that have been used to support an argument in the thesis have been reprinted in full.

4.2.7. Administration of the Interviews

It should be noted that the researcher conducted interviews with 16 non-native RA writers. Of the sixteen, twelve RA writers expressed willingness to participate in a subsequent interview which aimed at exploring some of the composing strategies the writers resort to in the process of writing to turn out a publishable RA.

Interview time depended on the nature of the subject area and the individual interviewee in terms of the contribution he could make based on his special knowledge, communicative skill, willingness, as well as the time they took to provide information. The time spent on each of the first and second interviews ranged between 30-40 minutes.

Furthermore, after completing my own analysis of the RA writers' texts, I approached them, so that they could act as specialist informants, in order to validate my analysis. At the end of this particular meeting, I asked each of them to voice his/her opinion on our RA text analysis and what this analysis suggests. The maximum time spent on this meeting was one hour.

4.3. Corpus selection and Text Analysis

This section considers the criteria, which guided the selection of the corpus to be analysed. It also attempts to clarify issues related to the framework for the analysis of the selected texts, as well as how the move structure analysis of texts can be validated.

4.3.1. Criteria for Corpus Selection

The major criteria, which guided the selection of the corpus from which texts were drawn, were authenticity (Pindi, 1988), reputation, and accessibility (Pindi, 1988 and Nwogu, 1996).

To ensure authenticity, the researcher only considered research articles the primary purpose of which was to present original research of each discipline. The purpose of the research article in any discipline, in Huckin and Olsen's (1983) view, is 'to advance an

argument of fact or policy' that the results of the research to be reported are valid and that given theories and results of previous research can be validated, supported or rejected. 'These arguments are made in a structure that is quite consistent over many fields and includes the following sections: 1. *Introduction*...2. *Materials and Method*... 3. *Results*... 4. *Discussion*...' (p. 275-6).

The selected texts were real examples of RAs (not simulated or popularised ones) produced by expert RA writers, successful in terms of publications.

Concerning reputation, the selected RAs were published in international, refereed and indexed journals. To meet the accessibility criterion which refers to the ease with which the researcher can obtain the corpus to be analysed (Nwogu, 1997), I was able to get access to the list of publications of each of those RA writers who were willing to participate as specialist informants in the semi-structured interview. A research article was chosen randomly from the list of publications of each participant.

With regard to the variation criterion which refers to the extent to which the selected RAs come from various disciplines, the sample of texts were drawn from disciplines such as medical sciences, natural sciences, engineering and humanities.

4.3.2. Procedure for Text and Data Analysis

As said earlier, the main goal of our study was to examine the overall structure of RAs from various disciplines to determine how far Swales' 3-move model of RA Introductions and Hopkins and Dudley-Evans (1988), and Dudley-Evans' (1994) move model of RA Results and Discussion sections can be generalised across disciplines. Thus the corpus was subjected to the form of move structure analysis put forward by the above-mentioned researchers. For the analysis of the Introduction section, the same basic categories identified by Swales (1990) were adopted. The analysis of the Results and Discussion sections was based on the communicative moves found by Hopkins and Dudley-Evans (1988), and Dudley-Evans (1994) in the analysis of natural science RA Discussion sections. I attempted to adapt and extend Swales' CARS model and that of Hopkins and Dudley-Evans to the analysis of the RA Methods sections.

4.3.2.1. Move Definition and Determination

It is worth mentioning that Swales does not offer a definition of the term *move* (Dudley-Evans, 1986). However, Swales thinks of the RA genre as consisting of sections, each of which contains a number of communicative moves to articulate the communicative purpose of the section. He views a *move* as a unit of analysis expressed in one or more constituent steps that show a preference for particular linguistic exponents.

It might be possible to argue that Swales has extended the idea of the functional 'range scale' of Hallidayan systemic linguistic analysis (e.g. Halliday, 1978) in which the linguistic units are arranged from larger to smaller, or from higher to lower. For example, the sentence or a clause as a linguistic unit consists of one or more smaller linguistic units such as phrases, each unit in turn contains one or more words as linguistic units of lower rank. Swales re-worked a ranked system of organisational levels in order to make it applicable to an idea of genre based upon the structuration and selection of communicative events. The largest level is the RA genre having an overall communicative purpose, and consisting of more than one section (Introduction, Methods, Results and Discussion). Each section, having a sub-communicative purpose, is made up of one or more moves at the level below, and each constituent move contains one or more smaller steps. The RA genre could be thought of as ranked because it is arranged from the biggest to the smallest units. The units, sections, moves, and steps, which differ in rank level, are supposed to articulate the communicative purpose of the RA writer.

Swales' implied concept of functional ranking has parallels to that put forward by Sinclair and Coulthard (1975). Within a classroom lesson, the authors put forward a ranked system of organisational levels. The largest level is the *transaction*, which consists of one or more *exchanges*. 'Moves combine to form exchanges; moves themselves consist of one or more *acts*' (ibid: 125). Each of these acts fulfils a communicative function. Swales also has a similar concept of *moves* in that his framework of analysis considers a move as 'a functional semantic unit whose length depends on writer purpose' (Dubois, 1997: 6).

On the other hand, the *move* as a unit of analysis is defined by Nwogu (1991: 114); and (1997: 122) as

'a text segment made up of a bundle of linguistic features (lexical meaning, propositional meanings, illocutionary force, etc.) which give the segment a uniform orientation and signal the content of discourse in it. Each move is taken to embody a

number of constituent elements or slots which combine in identifiable ways to constitute information in the move’.

Likewise, Skelton (1990: 456) points out that ‘move structure analysis tentatively assigns a function to a stretch of written or spoken text, identifies that function with one, or a set of exponents which signals its presence, and seeks to establish whether or not the pattern identified is a general one, by reference to ostensibly similar texts. If the pattern can be generalisable, its status as a move is confirmed’.

I will turn now to such difficult issues that arise as how a move can be determined as a unit of text analysis, what formal aspects could be adopted to mark the formal boundaries of the unit of analysis or the chunks of written discourse. In turn, this raises the question of whether we can adopt a unit of analysis below the sentence level as the clause, or a text above the sentence level such as a paragraph, or a unit of analysis between the sentence and the paragraph as proposed by Mckinley (1983). It was felt that adopting a formal criterion that equates a ‘move’ to a single sentence or a clause appeared to be inconsistent due to the reasons, for example, that a single sentence may include two moves, as noted by Swales (1990) and Dubois (1997).

To identify the boundaries of stretches of discourse, Brown and Yule (1983: 69) suggest making use of formulaic expressions. In the absence of such boundary markers, which are not often provided, the authors pointed out that the analysis could be carried out on the basis of the notion of topic, which is very difficult to define, or ‘the analyst is often forced to depend on his intuitive notions’ (ibid.).

Halliday (1984: 14) equates the *move* to the speech function of the *turn* in a dialogue. However, Halliday, like Swales, has not put forward a definition of the term *move* (Ventola, 1987: 90-3). Ventola shows that the criterion of equating a move to a speech function is too indefinite. This ‘will cause problems, as one does not know whether the speaker’s whole speaking turn or only a part of it (e.g. a clause) will be seen as a move where a speech function is realized’ (ibid: 92).

4.3.2.2. Move Structure Determination in RA Corpus

For the analysis of our texts, I considered the *move* as a stretch of text containing a proposition that has a major communicative function. Each stretch of text is differentiated from its following contiguous text segment in that the latter contains another proposition having a different major function.

Similar functional criteria to those adopted by Dudley-Evans (1994) and Nwogu (1997) were involved in identifying the move-structure of a text. According to their analysis, assigning a function to a stretch of text is guided partly by the lexico-grammatical clues found in each RA section. These linguistic exponents tend to signal the communicative functions which are in turn articulated by these moves. The other clue which guided the researcher to recognise a transition from one move to another was inference from the context and knowledge of the genre conventions (Dudley-Evans, 1994, and Nwogu, 1997). Thus move identification procedures included the following:

1-Explicit lexemes signalling information contained in a move (e.g., A lexical signal like ‘The *aim* of the present study...’ indicates ‘Occupying the niche’, whereas ‘The *methods* used to *collect data*...’ signals ‘Describing Data Collection Procedure’.

2- Preparatory or summary statements which signal the beginning of a move or a concluding move; e.g., *In conclusion*...

3- Temporal conjunctions signalling a recount of a procedural description; e.g., *First ...*, *Then ...*

4- Lexical items like *find*, *reveal*, *indicate* suggest a ‘Statement of finding’ move, and lexical exponents such as *attributed to*, *due to* indicate an ‘explanation move’.

5- Knowledge of the generic rhetorical organisational conventions

For example, a citation of previous literature indicates *establishing a territory* move or *reference to previous literature for support* or *disagreement* moves depending on the context of this citation. That is to say, if a ‘reference to previous research’ is encountered in the Introduction section, it signals *establishing a territory* move, whereas such reference indicates *reference to previous research* either *for support* or *disagreement* moves when it appears in the Results and the Discussion sections. A genre analyst is supposed to be aware of how these conventions occur in each genre and the sequence in which they happen to recur.

6- Headings and sub-headings of the text

7- Inference from content

In the absence of linguistic exponents, the researcher resorted to inference from the text content to recognise the types of moves. However, in cases where it was difficult to decode the content, the RA writer and sometimes a specialist from the same field was consulted.

8- Reference to other exemplars in the present text or other texts



Establishing whether a text segment embodies a particular communicative move, I compared it to other equivalent text segments that occurred in the present or other texts. However, the basis for the identification of a move is rarely made explicit because there are variations in the use of linguistic exponents employed by different RA writers to signal shifting from one move to another. Dubois (1997) has encountered this difficulty. She points out that 'Classifying content of independent clauses is unfortunately not an exact science, and some clauses required long and careful scrutiny. It is certainly possible that two equally well-motivated linguists would disagree over a given clause' (p. 11).

To achieve a greater understanding of the texts and to maximise the accuracy of move identification, it was felt necessary to read each RA under analysis several times. In the absence of defining criteria, I proceeded as follows: First, I identified the main constituent propositions constituting each section of the text. After that, I assigned a general communicative function to each constituent proposition. When a proposition embodies more than one segment of information, I assigned subsidiary functions to these constituent steps (Nwogu, 1997). Finally, I looked for any lexico-grammatical features that could be generalised as salient and identified with the expression of that particular propositional move.

4.3.2.3. A Sample Move- Structure Analysis of a Research Article

What follows is an example of a move analysis of a complete research article to illustrate how the framework of the text analysis referred to in the above section will be carried out on the analysis of the RAs' rhetorical sections (Introduction, Methods, Results, and Discussion, or other nomenclatures). The following text is an RA entitled 'Hydatidosis in Jordan: an epidemiological study of 306 cases' written by S.S. Amr *et al.*, in *Annals of Tropical Medicine and Parasitology*, Vol., 88, No. 6, 623-627 (1994). The RA by Amr is divided into four organisational sections: untitled Introduction, Subjects and Methods, Results, and Discussion.

4.3.2.3.1. Introduction Section

As mentioned above, the analysis of the move structure of the Introduction section was based on Swales' (1990) 3-Move model for the RA Introduction sections outlined below. The moves and their constituent steps of the Introduction section are:

- 1- Establishing a territory
 - 1.1- Claiming centrality
 - 1.2- Making topic generalisation(s)
 - 1.3- Reviewing items of previous research
- 2- Establishing a niche
 - 2.1- Counter-claiming
 - 2.2- Indicating a gap
 - 2.3- Question-raising
 - 2.4- Continuing a tradition
- 3- Occupying the niche
 - 3.1- Outlining purposes

or

Announcing present research
 - 3.2- Announcing principal findings
 - 3.3- *Indicating RA structure*

The following table shows a *Move-Step analysis* of the *Introduction* section of the above-mentioned RA. The linguistic exponents associated with these moves are in bold with Moves constituting the Introduction on the left and their constituent steps on the right.

Table 4.2 Sample Move structure analysis of RA Introduction

Move	Text (Introduction Section)	Move-steps
1- Establishing a territory	1. Hydatidosis <u>is</u> an endemic zoonotic infection in Jordan, common in domestic animals,	I.2-Making topic generalisation
	including sheep, goats, cattle, camels and donkeys (Dajani, 1978; Dajani and Khalaf, 1981; Al-Yaman <i>et al.</i> , 1985; Abdel-Hafez <i>et al.</i> , 1986; Abo Shehada, 1988). 2. Adult <i>Echinococcus granulosus</i> were recovered from 14% of stray dogs in Jordan (Ajlouni <i>et al.</i> , 1984). 3. Human hydatidosis occurs in Jordanian adults and children; as is generally observed (Schantz, 1982), the liver and lungs appear to be the most frequent sites of infection and multiple-organ infections sometimes develop (Sliman, 1976; Dajani and Shihabi, 1979; El-Muhtaseb, 1984; El-Muhtaseb and Shihabi, 1986). 4. Worldwide, only 13-19% of hydatid cysts are found away from the liver and lungs (Schantz, 1982).	I.3-Reviewing items of previous literature
II- Establishing a niche	5. How the cysts become distributed around the body remains controversial ; the parasite's eggs may enter the venules of the intestinal villi and then be carried into the liver by the hepatic portal vein. 6. It is also thought that the oncospheres may enter the lymphatic lacteal, and from there be spread more generally throughout the body before forming cysts (Schantz, 1982).	2.2- Indicating a gap
III. Occupying the niche	The present study is of 306 histologically confirmed cases of human hydatidosis admitted to five Jordanian hospitals in an 11-year period (1976-1986), with particular emphasis on the organs and tissues involved and on the epidemiology of hydatidosis in Jordan.	3.1- Announcing present research

The above analysis illustrates that in structuring the Introduction section, the authors began with the move: *Establishing a territory*. This is indicated by the constituent steps, *Making topic generalisation* and *Reviewing items of previous research*. The authors proceeded to *Establishing a niche*, a move represented by *Indicating a gap* step; and closed the Introduction with *Occupying the niche* which announces the research to be presented.

The structure of the Introduction section presented above seems fairly straightforward in the sense that Swales' model was applied without major difficulties. However, there is a minor difficulty envisaged in deciding whether sentences 5 and 6 in the Introduction include one move or two. If we apply Swales (1990: 148-159), the sentences appear, at first glance, to contain three functional steps: *Question raising*, *Indicating a gap* and *Reviewing items of previous research*. The first two steps indicate the *Establishing a niche* move, whereas the third stands for *Establishing a territory* which is a different move.

What give rises to the above interpretation are the linguistic exponents utilised by Swales to realise these steps which in turn represent the aforementioned moves. According to Swales' (1990: 148-159), the indirect question 'How the cysts become distributed...' is a linguistic means of *Question raising*, which is one of the constituent steps of *Establishing a niche*. The other part of the first clause, 'remains controversial', is a lexical negation or quasi-negation, signalling the *Indicating a gap* step, and is another constituent of the same move. The latter clause of sentence 5 and sentence 6 indicate *Reviewing items of previous research* which is realised by a non-integral form of reference, a step which is a constituent element of the move *Establishing a territory*. At second glance, the fifth sentence reads like a representation of Move 2- Step 2, *Establishing a niche* (Indicating a gap). The sentences were eventually classified as a Move 2 since, although the sixth sentence includes a reference to items of previous research, it indicates a gap in the literature reviewed. The content of the second clause of sentence 5, and sentence 6 seem to reinforce the idea that the gap is still there since no definite answer was introduced by the above-mentioned author, '(Schantz, 1982)', to 'How the cysts become distributed around the body'.

Thus it becomes clear that move structure analysis procedure involves 'a degree of subjectivity that is perhaps unavoidable' (Holmes, 1997: 325).

4.3.2.3.2. Subjects and Methods

As is shown in Table 4. 3 below, the Subjects and Methods section appears as a two-move section. The organisational structure of this section begins with the *Sampling procedures* move followed by *Describing data analysis procedures*. The linguistic exponents signalling these two moves are written in bold type.

Table 4.3 Sample Move structure analysis of RA Methods section

Move	Text (Subjects and Methods Section)
1. Describing a sample	The information investigated in the present study was assimilated from the records of five Jordanian hospitals for the 11 years 1976-1986 : (1) Departments of Surgical Pathology and Surgery, Jordan University Hospital (JUH), Amman (a teaching, tertiary-care, referral centre which receives patients from all parts of Jordan); (2) King Hussien Medical Center, Amman (serving military personnel and their dependants from the whole country); (3) Surgical Pathology Laboratory, Al-Bashair Hospital (receiving specimens from government hospitals throughout Jordan); (4) the Islamic Hospital, Amman (the largest private hospital in Jordan); and (5) Karak Government Hospital (Serving towns in the south of the country). All reports documenting cases of hydatid cysts which were histologically confirmed were extracted.
2. Describing data analysis procedures	The demographic data for these cases, including names, ages, occupations and residences and the sites and numbers of cysts were re-recorded and tabulated.

4.3.2.3.3. Results and Discussion Sections

Analysis of the Results sections, Discussion sections and the coalesced Results and Discussion was based on a modified version of the move analysis of the Discussion sections put forward by Dudley-Evans (1994). These two sections show a degree of overlap (Brett, 1994) between the type of moves included in each section. For example, ‘Statement of Results’ moves found in the Results sections also occur in the Discussion sections of the RA corpus.

Dudley-Evans (1994: 225) identified the following nine moves:

1. Information move
2. Statement of Result
3. Finding
4. (Un)expected outcome
5. Reference to previous research
6. Explanation
7. Claim [hypothesis (hedged claim) and deduction (unhedged claim)]
8. Limitation
9. Recommendation

Tables 4.4 and 4.5 below elucidate how the analysis of the Results and the Discussion sections will be carried out.

4.3.2.3.3.1. Results

With regard to the move structure of the Results section, I noted that the authors initiated the rhetorical structure of this section of the present article by a *Statement of result* move followed by the metadiscoursal move, *Referring to supporting data*, to locate these results.

The Results section proceeds in a similar fashion; it consists of a repetition of the same two moves presented in the same order. The following table demonstrates the Move structure analysis of the Results section. The linguistic exponents signalling these moves are written in bold type.

Table 4.4 Sample Move structure analysis of an RA Results section

Move	Text (Results Section)
Statement of result/finding	Of the 306 cases included in the study, 185 (60%) were female, with a mean \pm S.D. age of ; 32 ± 17.6 years, and 121 (40%) were male, aged 30.6 ± 18.7 years.
Referring to supporting data	The distribution of cases by age and sex is shown in the Fig.
Statement of result/finding	Over a third of all cases (35.8%) was <21 years old. Occupation was only recorded for 271 of the cases; the commonest occupation was house-wife ($N= 132$), followed by school students (91), farmers (12) and children <7 years (nine). Other occupations included teacher, accountant, government employee, merchant, construction worker and shepherd. Ten cases (all males aged >60 years) had no specific occupation. Most (80.5%) of the 102 cases who had been asked the relevant question reported contact with dogs.
Referring to supporting data	Infection rates by organ or tissues are given in Tables 1 and 2.
Statement of result/finding	The liver was the most affected organ (57.8%), followed by the lungs (26.4%). The kidneys, peritoneal/abdominal cavity and spleen were less frequent sites. Rare sites of involvement were the appendix, soft tissues of the neck, spine, breast, thyroid, uterus, ovaries, orbit and the urinary bladder. The number of cysts/case ranged from one to 40, with diameters ranging from 0.5-20 cm.
Referring to supporting data	The liver was always involved in multiple- organ infections in addition to one to three other organs or tissues (Table 2).

4.3.2.3.3.2. Discussion

As is shown in Table 4.5 below, the organisational pattern of the Discussion section indicates that this section consisted of two move cycles, each of which contains a series of moves. The first cycle began with an *Information move*, followed by a *Statement of result*, which proceeded to *Reference to previous research* moves. These moves include a series of references each of which conveys a different function, such as ‘support’ or ‘disagreement’. The first cycle concluded with the *Reference to previous research* (for

support) move. On the other hand, the second cycle is headed by a *Statement of result*, followed by a *Reference to previous research* and then an *Explanation move*. After that the researchers provided *Reference to Previous research* moves followed by an *Explanation* and then referred to previous research to support this *Explanation* move. Lastly, the authors gave an *Information move* followed by an unhedged *Claim* and closed the cycle with a *Recommendation* move.

Table 4.5 below illustrates the move structure of the Discussion section of the present RA. The linguistic features signalling the occurrence of the above-mentioned moves are written in bold type.

Table 4.5 Sample Move structure analysis of RA Discussion section

Move-cycle	Text (Discussion Section)
Cycle I	
Information move	Despite the improvement in medical services witnessed in Jordan in the last few decades, hydatid disease is still endemic, causing morbidity and occasional mortality. Two of the 34 children with cysts who were operated on at JUH and described by El-Muhtaseb and Shihabi (1986) died. Complications of hydatid disease included pleural effusion, broncho-pleural fistula, haemothorax, jaundice and anaphylactic shock (Sliman, 1976; Kalani and Broadhead, 1981).
Statement of result/finding	Amongst the present Jordanian cases, the liver was the most affected organ (infected in 57.8% of cases), followed by the lung (26.4%). These values are similar to those reported in
Reference to previous research for (support)	Iran (Nasseh and Khadivi, 1975), Libya (Dar and Taguri, 1978), Jordan (Dajani and Shihabi, 1979; El-Muhtaseb, 1984), Iraq (Al-Mukhtar, 1989) and Saudi Arabia (Al-Kraida et al., 1988).
Reference to previous research for (disagreement)	However, Goldsmith et al. (1991) found the lungs were the organ most often infected (38% of cases) among 224 Arab and Druze patients, followed by the liver. Although air-borne infection has been proposed, the liver. most studies, including
Reference to previous research (for support)	the present, indicate that the liver acts as the primary filter (see Dar and Taguri, 1978).
Cycle II	
Statement of result/finding	The kidney was affected in 3.5% of the patients.
Reference to previous research for (support)	This is close to the rate reported from Iraq by Shawket and Al-Waidh (1974) , who reported 57 cases of renal hydatid disease (4.2%) out of a total of 1346.

Explanation	In rural Jordan, women are more closely associated with domestic and farm duties, such as milking animals, watching sheep and goats and cultivating crops, than men. Most men are engaged in military or government services or other occupations not related to farming. Many of the present cases were in fact dependants of the military service personnel, who usually live in villages scattered all over Jordan. Families usually tend to move away from their permanent dwellings during late spring and early summer, to give their domestic animals better grazing. They then live in camps, with dogs to guard the campsite and sheep and relatively primitive and inadequate personal hygiene and washing facilities. Any school children join their families in the camps. Perhaps this practice explains the relatively high infection rates among females (housewives) and young males.
Reference to previous research for support	Children <15 years old constituted one-third of reported cases in Iraq (Mahmoud and Al-Janabai, 1983).
Reference to previous research for (support)	Sex differences are not uncommon in hydatid disease. In some of the tribal groups of East Africa, the prevalence of hydatid disease may reach 5.6% (Macpherson, 1983), with women accounting for the majority of the cases. A recent study of hydatid disease among the Hamar people in southern Ethiopia revealed that cysts were most common among women aged >40 years (Klungsoyr et al., 1993).
Reference to previous research for (disagreement)	In contrast, Nasseh and Khadivi (1975) found that men were more often infected than women in Iran.
Explanation	Sheep, goats, cattle and camels are slaughtered outdoors without veterinary inspection in most Jordanian villages and organs infected with hydatid are not properly condemned.
Reference to previous research for (support)	Several reports indicate high infection rates in Jordanian farm animals (Dajani, 1978; Dajani and Khalaf, 1981; Al-Yaman et al., 1985; Abdel-Hafez et al., 1986; Abo Shehada, 1988) and dogs (Ajlouni et al., 1984).
Information move	The practice of eating raw, unwashed wild plants (e.g. <i>Malva</i> sp.), potentially contaminated with the faces of infected dogs, is quite common among villagers, particularly during spring. Additionally, many locals report geophagia in children and pregnant women and, as seen in the present study, human-dog contact is common.
Claim (Deduction)	All these practices support the endemicity of hydatidosis in Jordan.
Recommendation	Further investigation into these factors is needed if the disease is to be controlled effectively.

Our sample analysis of the Results and Discussion sections revealed that Dudley-Evans' model seems to be workable, though there are a few observations.

1. Dudley-Evans' (1994) definitions of *Statement of result* and *Finding* moves show a high degree of overlap. Both of these moves, according to his view, have the same function, apart from the fact that the *Finding* move presents 'observations arising from

the research' (ibid: 225). Since these moves might be used interchangeably, we opted to use *Statement of result/finding* to stand for both moves, and to coin a separate move having a metadiscoursal function named *Referring to supporting data*. The function of the coined move is to refer to and locate the visuals and non-verbal data to be presented and commented on by the successive moves, despite the fact that Dudley-Evans includes reference to graphs and tables as a constituent element of the *Statement of result/finding* move.

It could be argued that this new separate move defines parts of the text, which contain data to be presented to support the stated results without commenting on or describing them. Thus it has a function that is different from that of the *Statement of result* which is meant to present the actual observation or finding arising from the research.

2. The second observation is that Dudley-Evans' *Information move* is over-generalised to include providing information about the 'theory, aim of the research, the methodology used, previous research that is felt to be necessary for the understanding of what follows in the move cycle' (Dudley-Evans, 1994: 225). Thus, it was felt that it would be more convenient to further delimit the scope of this move. For example, according to Dudley-Evans' definition of this move, we assigned an *Information move* to the first paragraph of the Discussion section since it talks about the previous related research. However, the function of the information included in this paragraph also signals a *Reference to previous research* move, according to Dudley-Evan's model. Thus, for the sake of consistency, it would be much more convenient to assign *Reference to previous research* to the content provided in this paragraph. Again, these different interpretations reinforce the previously mentioned idea concerning the unavoidable degree of subjectivity on the part of the genre analyst that might affect the validity. Thus a validation of our text analysis is needed as will be further explained in the following section.

4.3.3. Validation of Text Analysis

In the process of conducting the move-structure analysis of the various research articles, I encountered a few problems. Some of these problems were the technicalities encountered across disciplines, the nomenclature of moves and sometimes the demarcation between the moves. A further problem was the heterogeneity of the academic disciplines to be analysed. It was found that a particular generic structure

operating in one discipline might not necessarily be transferable to other RAs in other disciplines. These problems are inevitable in this type of multidisciplinary analysis.

To avoid these problems and to validate my analysis, I decided to resort to the expertise of specialists in the fields from which the texts were drawn. By way of illustration, the same RA writers whose texts were analysed were consulted about their views of the way I assigned the communicative moves to the texts under analysis. Their opinions and advice were taken into account.

What follows next is an attempt to present some of the researchers who have made use of and argue for the validity and the usefulness of specialist informants as a validation procedure.

The usefulness of specialist informants as a research tool in helping ESP oriented discourse analysis researchers is attributed to Larry Selinker (1979). The author emphasises that this is a useful tool for researchers who are not acquainted with the language of the scientific texts and professional journals, which they have to deal with. For Huckin and Olsen (1984: 129), 'the most useful specialist informant one can find for an LSP text is the actual author of the text'. This recommendation arises from a study in which the authors made use of specialist informants, the author of the sample of the text they studied and another specialist in the same field. Huckin and Olsen did encounter inconsistencies in the two specialist informants' interpretations of the same text. At the same time, the authors (*ibid*: 120) argue that this research tool is time consuming. However any communicative analysis, because it deals with issues of meaning, is likely to encounter this problem. Likewise Bley-Vroman and Selinker (1984: 4) advocate the use of the subject specialists informants as a final step. Tarone *et al.* (1981) share the same opinion of the necessity of using the original author as a specialist informant. For example, they co-authored with Icke, who was the writer of the astrophysics RA to be analysed, a paper entitled 'On the use of the passive in two Astrophysics Journal papers' in order to determine what rhetorical functions condition the choice of the linguistic features. The authors emphasise the advantage of working with Icke as a subject area specialist despite the fact that he is not a native speaker of English. They maintain that 'his knowledge of the subject matter was absolutely essential to our analysis of the rhetorical structure of these papers', (quoted in Swales, 1988: 193).

Following the same line, Pindi (1988) consulted both the editor of the reports he analysed and a practising economist to validate the linguistic choices for forecasting in

economics reports, specifically, the use of modality in the professional context in economic forecasting. Similarly, Dudley-Evans (1994) cross-checked his move analysis of the Discussion sections with specialist informants from the same discipline.

In the light of what we have said, this overview demonstrates a consensus among text analysts on the feasibility of using a subject matter specialist informant to help them understand a technical text. On the other hand, Swales (1990: 129) argues that

‘over-reliance on specialist informants may invite the opposite danger of analysis ‘believing all that they hear’. ... and that it raises uncertainty when comparing RAs from different disciplines (where instability is inevitably created by relying on *different* informants for each discipline)’.

To avoid the above problem, I did not leave the informants to establish their own analysis but rather produced one which was the product of the dialogue that was opened with them. Thus their subject area skills together with my ability to reveal text generic structure to them were combined in order to produce a sound move structure analysis of the corpus.

Thus, validation of our text analysis (Use of specialist informants) was as follows:

- 1- After completing the third draft of my text analysis, each RA writer was approached in person. Specialist informants were the RA writers themselves; in cases of co-authorship, usually the first or the second author was approached.
- 2- The framework of genre analysis, which is based on Swales’ CARS model of RA Introductions and Dudley-Evan’s model of Results and Discussion sections, was introduced and explained to each of the informants. The RA writers were introduced to the internal ordering of the RA sections and the procedure we used to identify the schematic structure of the Introductions, the Results and Discussion sections by showing them representative examples of an Introduction section analysed by Swales, and a Discussion section analysed by Dudley-Evans.
- 3- They were also briefed on the rhetorical moves constituting each section and the constituent options of each move, together with an idea about the linguistic features that might be used to signal a transition from one move to another.
- 4- The completed drafts of the authors’ RAs whose move structure has already been analysed were utilised as worked examples to further illustrate what is mentioned in step 2 and 3 above.

5- Each RA writer was given a completed draft copy of the move structure analysis of his/her RA, and was asked to read it in his/her free time in order to be given a chance to provide comments and feedback on my analysis.

6- Specialist informants were asked to comment in writing or orally on any changes they would like to make on the drafts. They were required also to further check the communicative purpose I assigned to each stretch of discourse or move in the RA sections. This is ascribed to the fact that I am not fully aware of the content schemata of the various RA texts. Thus, I sometimes was not sure about the purpose of some stretches of discourse texts. I attempted to find out whether the purpose I assigned to each move conformed to the author's own sense.

7- The informants' comments were collected and read carefully by the researcher and areas of disagreement were identified.

8- Whenever inconsistencies were encountered, I approached the specialist informant again in a face to face situation to discuss these cases and finally tried to provide optimally useful interpretations.

9- The RA authorial comments negotiated were added to the final draft of our analysis to enrich and give it some supportive validity.

This procedure assists me, as a genre analyst, to see the information content and the structure of the text through the specialist informants' eyes as well as through my eyes.

However, it appears later that despite the limiting conditions for move identification and determination a text analyst may forward, these procedures sometimes involve a degree of inconsistency and subjectivity which is, perhaps, unavoidable in qualitative analysis.

5. A Genre Analysis of RA Rhetorical Structure across Disciplines

5.0. Introduction

The aim of this chapter is to examine the rhetorical structure of 16 research articles (RAs), drawn from various disciplines, by carrying out the generic move analysis procedure put forward by Swales' (1990). The objective is to find out how far generic models can be generalised across academic disciplines.

In this chapter, we will start with a brief description of the corpus. Section 2 presents an overview of the nomenclature of the formal divisions and section structure of the RAs in the corpus. Then, Section 3 examines the move structure of the Introduction sections. Section 4 studies the move structure of the Methods sections. The move structure of the Results and Discussion sections will be looked at in Section 5. Each of these sections will be terminated with a discussion of how far RA writers make use of the RA genre models and to what extent these models are reflected in the RA products drawn from various disciplines. Finally, Section 6 provides concluding remarks.

5.1. Description of the Corpus

The corpus consists of 16 RAs written in English by Jordanian expert scholars who appeared either as single authors or co-authors with other native and/or non-native speakers. The English RAs were published in professional, indexed and refereed journals. However, both non-native and native RA writers writing in English are required to adopt the organisational patterns employed by peer authors publishing in the same journals for the reason that they share a commonality of communicative purpose (i.e. to present research that is neither simulated nor popularised but which is original to their speciality). Thus, their RA texts produced, as argued by Swales (1990), are said to belong to the same genre. This is because they share the same communicative purpose and belong to the same discourse community, which is characterised by utilising a genre to articulate its discoursal expectations. The notion of discourse community is based on

sociorhetorical groupings rather than on *sociolinguistic* ones (ibid: 24). Its members are supposed to communicate with one another in distant and various places, despite the fact that they share different cultural concepts. As mentioned in the Methodology Chapter, both non-native and native speakers have to adhere to the prescribed schematic structural patterns and preserve the conventions of a scholarly RA so as to meet the requirements of journal style sheets and instructions to authors, on the one hand, and to satisfy the discourse regulatory conventions presupposed and shared by peers, on the other.

The present RA corpus is drawn from a variety of disciplines and sub-disciplines subsumed under the following main areas: medical science represented by paediatrics, anatomy, surgery, nursing, pharmacy, and zoology; engineering including sample articles from chemical engineering, and electrical engineering; maths represented by algebra, statistics and applied maths; physics (theoretical and applied); chemistry; and social sciences represented by law, and history. The sample articles appeared in the following indexed and refereed journals:

A) Articles from medical science

Paediatrics: ‘Effectiveness of iron therapy on breath-holding spells’, *Journal of Pediatrics*, 17 (4) (pp.547- 550), 1997.

Anatomy: ‘Morphology of neurons in the anterior hypothalamic area and supraoptic hypothalamic nucleus of the adult human brain’, *The Italian Journal of Neurological Sciences*, 17 (pp. 261-266), 1996.

Surgery: ‘Pyloromyotomy through circumumbilical incision’, *Journal of the Royal College Surgeons of Edinburgh*, 37, June (pp. 175- 176), 1992.

Nursing: ‘Jordanian nursing students’ interpersonal behaviors’, *Health Care for Women International*, 16, (pp. 213- 220), 1995.

Pharmacy: ‘Mutagenic and toxic activity of some Jordanian medicinal plants’, *International Journal of Pharmacognosy*, 33 (1) (pp. 61-64), 1995.

Zoology: ‘Hydatidosis in Jordan: an epidemiological study of 306 cases’, *Annals of Tropical Medicine and Parasitology*, 88 (6) (pp. 623- 627), 1994.

B) Articles from chemistry (1 RA)

Chemistry: ‘Chemical and electrochemical behaviour of titanium in methanol- water-HCL mixtures’, *British Corrosion Journal*, 26 (2) (pp. 133- 134), 1991.

C) Articles from engineering

Chemical Engineering: 'Diffusivity of nitrous oxide in N-Methyldiethanolamine + diethanolamine + water', *Journal of the Chemical Engineering Data*, 40 (pp. 630-631), 1995.

Electrical Engineering: 'Personal computer flexible Multichannel interface for data acquisition of low-frequency signals', *IEEE Transactions on Instrumentation and Measurement*, 37 (4) (pp. 510- 514), 1988.

D) Articles from physics

Applied Physics: 'The optimization of tank-volume-to-collector-area ratio for a thermosyphon solar water heater', *Renewable Energy*, 7 (3) (pp. 289-300), 1996.

Theoretical Physics: 'Probing the couplings of the top quark to gauge bosons', *Physics Letters B*, 337 (pp.145- 151), 1994.

E) Articles from maths

Algebra: 'A note on BOL algebra operators', *Far East Journal of Mathematical Sciences*, 5 (4) (pp. 651- 656), 1997.

Statistics: 'Extinction time of a diffusion model and catastrophe process', *Modelling, Measurement and Control*, 12 (1) (pp. 27-32), 1995.

Applied Maths: 'Propagation of waves in rectangular ducts with sinusoidal undulations', *Journal of the Acoustical Society of America*, 67 (5) (pp. 1472-1476), 1980.

F) Articles from social sciences

Law: 'Central bank liability to depositors', *Journal of Business law*, (pp. 481-489), 1992.

History: 'Landlord and peasant in early Islam', *Der Islam*, 56 (1) (pp. 97- 105), 1979.

5.2. Section Structure of the Research Articles

A cursory look at the headings given for the section divisions of the RAs in the table below reveals that most of the RA writers generally adopt the IMRD formats. However, there is a degree of inconsistency in the section headings and sub-sectioning used in that a few articles have formal divisions with section or topical titles.

Table 5.1 Organisational structure of RA corpus

RA	Structure (Sections)
Paediatrics	Introduction, Methods, Results, Discussion
Anatomy	Introduction, Materials & Methods, Results, Discussion
Surgery	Introduction, Patients & Methods, Results, Discussion
Nursing	Introduction, Method, Results, Discussion, Summary & Recommendations
Pharmacy	Introduction, Materials & Methods, Results & Discussion
Zoology	Introduction, Subjects & Methods, Results & Discussion
Chemistry	Introduction, Experimental, Results & Discussion, Conclusion
Chemical Engineering	Introduction, Experimental Section, Results
Electrical Engineering	Introduction, Hardware design Software design, Conclusion
Physics (Applied)	Introduction, System Description and Simulation Model, Results & Discussion, Conclusion
Physics (Theoretical)	1) Introduction, 2) Probing the top quark coupling at LEP, 3) At the Tevatron & the LHC, 4) At the NLC, 5) Discussion & Conclusion
Maths (Applied)	Introduction, Method of Solution, Solutions, Conclusions
Maths (Statistics)	Introduction, (Extinction Time)
Maths (Algebra)	Introduction, Results
Law	Introduction, No Methods, The Bank's Duty of Care, Loss Caused by the Breach of the Bank's Duty of Care, Loss is Recoverable, Conclusion
History	Untitled Introduction, No Methods, Unsegmented Text, Untitled Conclusion

It was observed that all the texts were divided into sections apart from that of history, which featured unsegmented continuous text and untitled sections. The sections of the other RAs were titled although the number of sections and their titles varied quite considerably. The organisational patterns of the medical sciences, and to some extent that of chemistry were quite similar. They contained recognisable Introduction, Methods, Results, and Discussion sections or an integrated section of Results and Discussion. However, there were slight variations in the nomenclatures used for the Methods sections of the medical sciences. For instance, anatomy and pharmacy RAs had an equivalent section entitled 'Materials and Methods', whereas zoology and surgery RA writers named this section 'Subjects and Methods', and 'Patients and Methods' respectively.

On the other hand, perhaps unsurprisingly, there was a marked difference between the other disciplines. There were significant differences in the ways the sections of physics,

engineering, maths, and social sciences were titled. The number of sections included in each RA also varied. For example, the theoretical physics RA contained five numbered sections '1. Introduction, 2. Probing the Top Quark Coupling at LEP, 3. At the Tevatron and the LCH, 4. At the NLC, and 5. Discussion and Conclusion'. The authors presented the experimental procedures and results pertinent to each section of 2, 3, and 4, and discussed the results of each section individually. They also allocated section 5, 'Discussion and Conclusion' for the discussion of the same preceding sections. The electrical engineering RA, on the other hand, included four sections: '1. Introduction, 2. Hardware Design, 3. Software Design, and 4. Conclusion'. Thus, the authors did not include a separate section for Results and Discussion. However the results pertinent to each of sections 2, and 3 were presented in the same section after the description of each design. Likewise, the chemical engineering RA was closed by a Results section. The emphasis, here, seems to be on experimental sections and the results obtained and not on their interpretations or relation to other results obtained by other researchers in the same field (Dudley-Evans, 1993).

The author of the chemical engineering RA maintains that the reason for not having a discussion as a concluding section is due to the fact that the *Journal of the Chemical Engineering Data* is directed to the publication of experimental and derived data. The 'Guide for Authors' of this particular journal confirms the author's argument in that this journal is 'exclusively devoted to precise and accurate data on physical, thermodynamic, and transport properties of well-defined materials. The data are presented in sufficient detail to form a working basis for applying the information to scientific and engineering objectives' (1990: 3A). However, according to the policy of the journal, RA writers should refer to the previous related research to compare the new data with the previously published data. When the difference between the present results and those reported by other researchers exceeds the accepted values authors should attempt to account for the discrepancy and provide explanations for the difference.

It is also noteworthy that the structure of maths and social science RAs was rather more distinct. The statistics RA was divided into two sections, Introduction and Body entitled by the topic to be presented, 'Extinction Time'. Likewise, the algebra RA included only two sections, 'Introduction' and 'Results'. Thus, the body of the algebra and statistics RAs includes neither a section for Methods nor another for Discussion to relate the results to the on-going research within the field. The body or the Results section only

includes theorems and proofs. In the body of the RA, the researcher started proving the theorems in sequence in a way that the proof of the first theorem will be used in proving the following one.

The law RA in the present corpus featured unconventional sub-sectioning in that it was divided into an untitled Introduction followed by three titled sections indicating the content or the body of the RA and closed with a conclusion section. These three titled sections will be referred to as the argument or the Discussion section. For the history RA, it appeared to have an untitled Introduction, a main argument and an untitled conclusion. The absence of the Methods sections in history, law, and maths RA texts may be due to the nature of the data, in the sense that ‘they are not constructed by the researcher’ (Holmes 1997: 328).

5.3. Move Structure of RA Introductions

In this section, we will present the results of the move-structure analysis of the 16 RA Introduction texts with the intention of seeing how researchers from various disciplines organise their Introductions. The model adopted for the analysis of the Introduction sections in the present corpus is that of Swales (1990). As briefly introduced and discussed in Chapter 3 of this thesis, Swales’ CARS model consists of three sequenced moves each of which is realised by one or more constituent option(s) or strategies.

The results of the analysis will show the moves of the Introductions that fit the CARS model fairly closely and those that do not seem to fit this pattern. First, I will present an outline of the most common moves and their constituent steps encountered in the Introduction sections of the sample texts. I will then investigate each move in more detail, including the comprising strategies or options of each move together with the linguistic exponents to express each move, where it is possible. Within this stage, I will begin with the list of moves that reflect a faithful adherence to the CARS model, followed by the other component strategies that tend to occur in the corpus in addition to those proposed by Swales (1990). Finally, I will attempt to show where the CARS model sometimes fails to recognise some rhetorical functions (i.e., what the writer is trying to accomplish), and why it cannot adequately account for the rhetorical structure of all the sections.

The results of the move-structure analysis of these RA Introduction sections revealed the following most common moves to occur in the sample.

- 1- Establishing a territory
 - 1.1- Claiming centrality
 - 1.2- Making topic generalisation(s)
 - 1.3- Reviewing items of previous research
 - 1.4- Discussing previous research
- 2- Establishing a niche
 - 2.1- Indicating a gap
 - 2.2- Question raising
 - 2.3- Continuing a tradition
- 3- Occupying the niche
 - 3.1- Outlining a purpose or Announcing present research
 - 3.2- Announcing principal findings
 - 3.3- Indicating RA structure and/or content
- 4- Stating research motivation
- 5- Limiting conditions/ or constraint assumptions
- 6- Indicating research methods
- 7- Providing information
 - 7.1. Background information
 - 7.2. Presenting definitions
 - 7.3. Modelling a problem

5.3.1. CARS Model Moves Occurring in the RA Corpus

In this segment I will demonstrate the CARS model moves that occurred in the present corpus and the linguistic features that tend to express them, together with illustrative examples from the corpus.

5.3.1.1. Establishing a territory

In 12 out of the 16 Introductions, the writers begin with a *Move 1*. In 6 Introductions out of these 12, the authors establish the field by *Making a topic generalisation*. Other authors initiate their Introductions with *Claiming centrality* (i.e., claiming that the research to be presented is central to the discipline), and only 2 authors start their Introductions directly with *Reviewing items of previous research*.

In the present corpus, RA writers generally establish the field at the introduction's outset by using one or more of the following constituent options/strategies:

5.3.1.1.1. Claiming centrality

Claiming centrality is an appeal to the peer researchers 'that the research to be presented is part of a lively, significant or well-established research area' (Swales, 1990: 144).

This strategy is the first type of Introduction openers. Genre analysis of the present Introduction texts revealed that authors could claim that the research to be presented is central to the field in a number of ways. Some illustrative examples of centrality claims that have been extracted from the actual RA texts are given below, together with the linguistic exponents that tend to signal the occurrence of this strategy. In the following examples, the lexical signals indicating this move are underlined and the tense is written in bold type:

A. Claiming importance of the research to be presented

The authors in the present corpus tend to indicate the importance by reference to the central character of the topic using one of the following key signal lexemes: *essential*, *an integral part* or *recently* respectively. For example:

e.g.1. The nurse-client relationship **is** an integral part of nursing. (RA 4)

e.g.2. Historical developments, however, **are** essential to understand ideas, concepts, and theories of jurists. (RA 16)

e.g.3. Recently, blended aqueous solutions of these two amines **have found** application for selective absorption of H₂S ... (RA 8)

In the first two instances above, the authors attempt to assert the importance of the study by the use of simple present tense, whereas in the third instance the author claims centrality by the use of present perfect tense and the ‘time duration adjunct’ (i.e. *recently*). In other words, the topic to be reported is part of a lively research area established during a recent period.

B. Indicating continuing interest

Other centrality statements may include other lexical items, such as ‘interest’ and ‘attention’. RA writers also can establish a territory by indicating interest or/and citing previous researchers who are interested in the topic to be dealt with. Representative authentic abbreviated examples of this are:

e.g.1. Corrosion and passivity of metals and alloys in organic solvents **is** a subject of continuing interest in recent literature, as evidenced by the number of the reports appearing. 1-4 (RA 7)

e.g.2. Wave propagation and attenuation in ducts received considerable attention because of the concern over reducing noise pollution. (RA 12)

e.g.3. ..., there **continues** to be an interest in developing interpersonal competence at a skill level (Conboy-Hills, 1986;..). (RA 4)

e.g.4. ,... a substantial number of interesting plants **are** available for investigation (Al-Eisawi, 1982). Interest **has** increased in the study of biological effects of traditional medicinal plants... (Meyer *et al.*, 1982). (RA 5)

C. Indicating standard procedures

Centrality is also indicated by claiming that the technique to be employed is one that is frequently used (Swales, 1981).

e.g.1. The Golgi impregnation technique **has** frequently **been used** to study different types of neurons... (RA 2)

This function seems to be indicated by a time adjunct exponent ‘frequently’ and the use of present perfect tense.

5.3.1.1.2. Making topic generalisation

The second option of Introduction openers is to establish the field by making ‘statements about knowledge or practice’ (Swales, 1990: 146).

If we consider the following examples we realise that the authors initiate the first move by making a general statement referring to the phenomenon to be reported and emphasising its commonality. Such instances typically include the use of: *common* and *commonly*, the ‘time duration of usual occurrence adjunct’. The present simple tense is generally used to claim generality about the phenomenon to be dealt with. In the following typical examples, the lexical signals are underlined and the tense is written in bold type:

e.g.1. Hydatidosis **is** an endemic zoonotic infection in Jordan, common in domestic animals... (RA 6)

e.g.2. ...(MDEA) and.... (DEA) **are** commonly **used** in the gas-treating industry as chemical solvents for the removal of acid gases.... (RA 8)

e.g.3. Hot water for domestic or industrial use **is** one of the most common applications of solar energy. (RA 10)

e.g.4. Breath-holding spells **are** a common pediatric problem, occurring in up to 27% of healthy children. (RA 1)

e.g.5. A BOL *algebra* B over a field F **is** an algebra in which $(xy \cdot z)y = x(yz \cdot Y)$ for all x, y, z in B . (RA 14).

Although the key lexeme *common* does not occur in the last example, it reports, according to the author's view, a general statement about a phenomenon in algebra.

5.3.1.1.2. Reviewing items of previous research

The third option in establishing a field, according to the CARS model, is *Reviewing items of previous research*. Thirteen Introductions in the present corpus included this step. Our analysis revealed that RA writers generally reviewed items of related literature after claiming centrality or making a topic generalisation about the topic to be presented. However, in two articles, the authors initiate their Introductions abruptly with reference to previous work. For instance:

e.g.1. Mathematical models for the growth of populations subject...have been studied from various points of view by Kaplan et al.(1975), ..., Brockwell et al. (1982), (1983), (1985), (1986), etc. (RA 13)

In the present corpus, electrical engineering, law and history RA writers did not review previous research. However, in other RAs the review segment sometimes comprised the bulk of the Introduction, as is the case in the nursing RA.

5.3.1.1.3. Discussing previous research

A few authors of the RAs in the present sample not only cited or referred to previous works, but they also reported and discussed the findings of previous research. They included one or more of the following constituent elements: presenting visuals, referring to supporting data, highlighting significant findings, explaining results and reporting recommendations of previous research. The constituent elements of this option can be illustrated with the following version of the applied physics Introduction text culled from the RA corpus:

Table 5.2 Exemplar text showing discussion of previous research in RA Introduction

Establishing a territory (Step 4)	Text (Introduction Section) (RA 10)
Reporting research methods of previous research	Shariah <i>et al.</i> Used the <u>TRANSYS simulation program</u> , which uses the <u>model</u> developed by Morrison and Braun [8], to calculate optimum values for the design parameters of a system using an electric auxiliary heater integrated into the storage tank with a daily hot water load of 250 l.
Reporting recommendations of previous research	They gave <u>recommendations</u> for diameter of the riser, the number of risers, the diameters of header and connecting pipes, the height of the tank, the height of the return pipe from the collector to the storage tank, the height of the electrical auxiliary heater in the tank and the relative height of the bottom of the tank from the top of the collector.
Referring to supporting data	The results of their study are shown in <u>Table 1</u> .
Highlighting significant results	An experimental study by Fanney and Klein [7] reported that a thermosyphon system had better performance than five active systems
Explaining results of previous research	<u>due to</u> thermal stratification in the storage tank.

Other representative, authentic and illustrative but abbreviated examples of this group are extracted from nursing and anatomy RAs:

e.g.1. Morrison and Burnard (1989) **found**... Other investigators **found** Although the results partially supported Taylor's et al.'s hypothesis ..., they did not identify the presence of basic gender differences.. . (RA 4)

The verb 'find' and the past passive are very common signals of this move.

e.g.2. This neuronal cell type **was found** in all hypothalamic nuclei. The second type was represented by bipolar neurons characterized by a fusiform or round neuronal cell body. The two dendritic trees emitted at opposite poles of the soma displayed little branching. There were some spines on the soma and/or the dendrites of these neurons. The third cell type was characterized by an irregular or multipolar soma with a few [2-5] densely spined dendrites. The second and third neuronal cell types **were found** in several hypothalamic nuclei, including the supraoptic nucleus (SON). (RA 2).

The nursing RA writer was asked about the reason for including detailed paragraphs to present, compare and discuss the shortcomings of the findings of previous researchers in the Introduction section. Her response was that her RAs frequently include a separate section entitled 'Literature Review'. The present RA does not include a separate title for

this section because the editor of the journal asked the authors not to do so. Besides, they were requested to shorten this section and to incorporate it within the Introduction section. I discovered that this author and her colleagues employ these moves in order to establish communal content background knowledge among the readers. To defend including this move, the author argued that her writings are not only addressed to peers but they are also addressed to another audience such as practitioner nurses and undergraduate students. The author argued that the inclusion of such detailed paragraphs of the findings of previous literature has other added purposes. It enables the writer to highlight the shortcomings of the findings of previous research so as to convince the peer researchers, on the one hand, and to develop an interest in other audiences and acquaint them with previous literature.

Likewise, the author of the anatomy RA was asked about the rationale of including a detailed account of the findings of previous researchers in the Introduction. He argued that he usually presents the principal results of the previous studies to help the reader relate the findings of the present study to those of previous researchers so as to save the reader's time.

I have dealt so far with the possible options or strategies used by the RA writers from various disciplines to establish a territory. Some of the linguistic exponents used to indicate the presence of these options have also been highlighted. In general, the results obtained bear resemblance to Swales' claims concerning the constituent steps of this move. However, beside the three possible steps of Move 1 described in the CARS model, I have found another less common strategy, i.e. 'discussing previous research', which is tied to the third step, *Reviewing items of previous research*. Furthermore, I found that the RA writers of electrical engineering and law did not include this move in their RA introductions.

5.3.1.2. Establishing a niche

The major strategies of establishing Move 2 in the Introductions, according to Swales (1990: 154-156), are 'counter-claiming', 'indicating a gap', 'question raising', and 'continuing a tradition'. The RA authors of the present sample employed all these strategies, apart from the first step, i.e., 'counter-claiming'.

5.3.1.2.1. Indicating a gap

Most of the Move 2 cases in the present corpus open with reference to a gap or some limitation in the previous research. Here are some examples of niche-establishment categorised according to the linguistic exponents proposed by Swales (1990) with the key signals of gap indication underlined. The tense signals are written in bold type, and the adversative connectors italicised.

a. Negative or quasi-negative quantifiers

1. Few research studies **have focused** on students' and nurses' interpersonal competence (Morrison & Burnard, 1989), and no study **has been conducted** in either nursing education or nursing service throughout Jordan. (RA 4)
2. *However*, there **are no** compelling reasons to believe that top quark couplings to other particles should be of the SM nature. (RA 11)

b. Lexical negation

1. An association with anemia, particularly iron-deficiency anemia, **has** previously **been reported** 7-8 *but* is still poorly understood.
2. The pathophysiologic mechanism and treatment of BHS remain controversial.³⁻⁹(RA 1)
3. Jurists are not interested in tracing historical development, *but* in formulating ideas and rules. ..., they completely overlook facts during the period of the Orthodox Caliphs.(RA 16)

c. Negation in the verb phrase and/or noun phrase

e.g. Although PC's can provide needed resources to process and store the measured signals ..., they **are** often not capable of collecting data without the addition of other circuits to do some specific functions. (RA 9)

The above cases suggest two observations: This move tends to contain an adversative sentence connector *However, although, yet* or *but* to mark the expressions of contrast. A second observation concerns tense. We notice that authors tend to choose between the present perfect and simple present, as is illustrated by the above verbs in bold type.

5.3.1.2.2. Question raising

The second means of establishing the niche is by raising direct or indirect questions. The following instance shows that *Question raising* is signalled by the use of an indirect question which is mentioned explicitly, such as 'raises a question'.

e.g.1. The collapse of the Bank of Credit and Commerce International (“BCCI”),... raises the question of whether the Bank of England (“the Bank”), as a central bank, can be held liable to the ordinary depositors of commercial banks for the losses caused by their banks’ insolvency if these resulted from the Bank’s negligence (RA 15)

5.3.1.2.3. Continuing a tradition

As maintained by Swales (ibid: 156), ‘this format seems to be chosen when there is a weaker challenge to the previous research’. As is shown in the following cases, there is no challenge to the work of others, but rather an expressed need or necessity of a simple extension of a previous work. The following skeletal example shows this.

e.g. As an extension of our previous work in the evaluation of *mutagenic and toxic* activities exhibited by some Jordanian medicinal plants (Al-Kofahi *et al.*, 1990; Mohmoud *et al.*, 1992), the present study reports... (RA 5)

The following example extracted from the Introduction of algebra RA may be considered as an implied reference to the above step.

e.g., A *BOL algebra* B over a field F is an algebra in which $(xy \cdot z)y = x(yz \cdot y)$ for all x, y, z in B . The identity is called the *right BOL identity*. The notion of BOL algebra derivation has been studied by Solarin [1], where he proved that there exist derivations of a BOL algebra B in its centrum. For more information the reader may consult Sabinin, Mikheev [2] and Schafer [3]. In this paper we give a shorter proof for some of the results in [1] besides generalizing some other results. (RA 14)

As is indicated by the example above, there is no explicit reference to Move 2 in this Introduction, while an implicit indication of building on the previous research can be figured out from the underlined sentence in the above example.

I have considered so far both the Move-Step options described in the CARS model that tend to occur in the present corpus and the linguistic signals to be expected. The results of our analysis seem to confirm Swales’ claims concerning the strategies the RA writers utilise in order to establish a niche and the means of niche-establishment categories. However, it would seem that there might be some disciplinary variations in the use of this move. For instance, there were no explicit examples of this Move in the Introductions of maths (applied maths, statistics, algebra), and chemistry, in our corpus. This claim needs to be validated by being tested out on new data from these fields. On the other hand, a close reading of the Introduction to the algebra article might bring out implicit indications of field establishment.

5.3.1.3. Occupying the niche

After indicating a gap or raising a question, it is anticipated that the RA writer, according to CARS model, will fill that indicated gap or answer the question. Hence Swales' label for this attempt is *Occupying the niche*. The possible options a researcher could make use of to occupy what has been established include one or more of the following: (a) *outlining a purpose*, or *Announcing present research* (b) *announcing principal findings*, and (c) *indicating RA structure*. In the present study, all the RA writers, apart from that of Surgery, included Move 3 in their RAs. We can now turn to our corpus to investigate the strategies of occupying the niche.

5.3.1.3.1. Outlining purposes or Announcing present research

Swales (1990: 159) points out that this step is an obligatory element in Move 3. The exemplars demonstrating this step, extracted from the RA sample Introductions, can be divided into two categories:

A) RA writers use purposive statements containing lexical items, such as, 'aim', 'goal', or 'purpose' to state the purpose explicitly. In the following examples that fell into this group, the purposive lexical signals are italicised, and the deictic element and the type of genre are underlined whereas the tense is written in bold:

1. The *goal* of the present investigation **is** to describe the morphological ... (RA)
2. The *aim* of this paper **is** to derive the distribution of extinction time and the expected time to extinction for a diffusion model ... (RA 13)
3. The *aim* of this study **is** to determine the optimum value of the storage tank height... (RA 10)
4. Our general *purpose* in conducting the present study **was** to identify the interpersonal behaviors of nursing students... (RA 4)

As is shown in the above group of examples, the occurrence of the lexical items 'aim', 'purpose', or the other relevant lexical signals generally marks 'Outlining purposes' of the new research.

B) In *announcing present research*, RA writers describe the main features of the research to be presented without using a purposive lexeme. In the following examples,

the deictic element and the type of genre are underlined while the tense is indicated in bold type.

e.g.1. ..., the present paper **reports** data from the testing of 39 extracts from Jordanian medicinal plants. (RA 5)

e.g.2. The present study **is** of 306 histologically confirmed cases of human hydatidosis admitted to five Jordanian hospitals, with particular emphasis on the organs and tissues involved and on the epidemiology of hydatidosis in Jordan. (RA 6)

e.g.3. In this paper, we **report** our measurements of the diffusion coefficients for N₂O... (RA 8)

e.g.4. So, it **is** worth studying the influence of water on passivity of Ti, in order to find the critical water content above which passivity occurs. (RA 7)

e.g.5. ..., we **describe** in this paper a simple but yet flexible interface which has these features. (RA 9)

e.g.6. In this paper we **constrain** the effective couplings of the top quark to gauge bosons... (RA 11)

e.g.7. This article **is devoted** to answering this question, ... (RA 15)

e.g.8. We here **present** the result of a double-blind, placebo controlled clinical trial evaluating the efficacy of iron therapy in BHS. (RA 1)

e.g.9. In this paper we **give** a shorter proof for some of the results in [1] besides generalizing some other results. (RA 14)

e.g.10. In this paper, we **use** the method of multiple scale to analyze linear waves propagating in a rectangular hard-walled duct whose walls have weak periodic undulations. (RA 12)

As can be intimated from the above examples belonging to categories A and B, there are clearly recurrences of certain signals employed by the RA writers to indicate a shift to Move 3.

1. There is a tendency for the early occurrence of the deictic elements *this, the present, here*.
2. The above deictic elements refer either to the type of genre (paper, article) or to the type of enquiry (study, work, and investigation).
3. The present tense is generally used when a reference is made to the type of genre or the type of enquiry; however, the past tense is sometimes used to refer to the type of enquiry.

These observations confirm the general picture of Move 3 portrayed by Swales (1990) concerning the occurrence of the predominating principal signals employed by the authors to indicate their arrival at Move 3.

5.3.1.3.2. Announcing principal findings

The second option of Move 3 is *announcing principal findings*, which occurred in 2 Introductions of the present sample. The cases of Step 2 options were found in the statistics, and algebra RAs. Examples of this option are:

e.g.1. Consider the process which has a small catastrophe rate ν . For times $t = 1, 2, 3, \dots$, each time interval the process either goes from $x \longrightarrow Bx$ with probability ν or diffuse (with no jumps) from $x \longrightarrow x$ with probability $1 - \nu$. (RA 13)

This step introduces hypothetical results which guide the behaviour of the proofs of the results in the sense that they will go either this way or the alternative way as is illustrated in the above example.

e.g.2. In this paper we give a shorter proof for some of the results in [1] besides generalizing some other results. (RA 14)

The RA author pointed out that the second example, above, refers to the results to be proven, in addition to outlining the purpose of the study. These results are ‘give a shorter proof than that of [1] and generalizing other results’.

5.3.1.3.3. Indicating RA structure and content

In the present sample, there was only the following case where the RA writer indicated the structure or the content of the RA to be presented.

e.g.1. In Section 2 we examine what we have learned about the top quark couplings ... In Section 3 we study how to probe the couplings In Section 4 we discuss how ... Finally, in Section 5 we discuss how to probe the symmetry breaking sector ... (RA 11)

Signals of Step 3 statements, as might be indicated from the above example are the use of numbers indicating sequence (e.g. 2, 3, 4); and the use of explicit lexemes (e.g. ‘section’).

In the discussion above, concerning Move 3, we have dealt with the three possible options for occupying the niche described in the CARS model. The present results concerning the type of Move 3 options that tend to occur in the present sample and the

linguistic exponents that are employed by the RA writers to indicate an arrival at Move 3 and its associate steps, show some resemblance to those presented by Swales (1990). On the other hand, there are a number of comments that can be made about Move 3. First, of the 16 Introductions in the present corpus, there was only one, the Introduction of Surgery RA, in which Move 3 was not included. Swales and Najjar (1987) also noticed the absence of Move 3 from 7 RAs out of a sample of 110 RA Introductions of physics and educational psychology. Likewise, Crookes (1986) found only one Introduction out of 18 with no Move 3. Secondly, the number of Introductions closing with Move 3 (5 Introductions) is lower than that of those closing with other moves (11 Introductions). A third observation concerns the fact that in some cases the Introductions included statements expressing additional options other than those described in the CARS model.

I have so far investigated those moves that seem to fit the CARS model fairly well. In the following section, I will explore the other moves employed by the authors of the present RA corpus and not documented as appearing in the Swalesian model, which merit discussion.

5.3.2. Moves Not Appearing in the CARS Model

Our RA corpus demonstrated that the content of the initial segments of the RAs did not necessarily only include the type of moves prescribed by Swales' model. In addition to the 3-move model of Introduction sections outlined by Swales (1990), I have found other less common moves used by authors of English RAs covering a wide variety of disciplines. The following communicative moves were found as a result of the analysis of the 16 RA Introductions. Each of these moves will be discussed and exemplified by instances from the corpus. The linguistic signals indicating the occurrence of each move are also pinpointed. Minor options found in our corpus included the following:

5.3.2.1. Stating research motivation

This communicative strategy justifies why the research to be presented or the purpose of which has been announced is important and how it contributes to the advancement of the field. It hypothesises the potential usefulness of the outcomes or the data being sought. In other words it signposts what the practical or the theoretical benefits will be.

This component seems to be tied to Swales' Move One- Step 1; however, it has an additional purpose, in the sense that Step 1 indicates the interest or the importance of the research to be presented, whereas the present option tends to justify 'how' and 'why' a piece of research is important. Furthermore, all the cases of this move encountered in the sample corpus occurred immediately before or after Move 3- Step 1, to justify the purpose of the research; in other words, it is a purpose beyond a purpose. Instances containing the present move cannot be thought of as examples of a recommendation move because recommendations are usually based on actual results obtained and discussed in the RA Results and Discussion sections, where the RA writer may indicate the significance or practical applications of the findings of the study. The present move is a justification of the research to be presented. However, the anatomy and nursing RA writers reiterate the significance or the practical applications of the research in the Discussion section as will be demonstrated later in the 'Recommendation' move.

Here are skeletal examples of this particular move culled from I corpus, and the lexical items signalling this function are underlined:

e.g.1. Research on the interpersonal orientation... will provide a basis for the planning of nursing program curricula ... Also, it will assist planners in identifying the need for interpersonal skills training programs for students. (RA 4)

e.g.2. This study may serve as a basis for further morphological studies related to ageing.... (RA 2)

e.g.3. The diffusion coefficients of all species in the liquid phase are important parameters required for modelling the mass transfer process. (RA 8)

e.g.4. Because the top quark is heavy relative to other observed fundamental particles, one expects that any underlying theory will easily reveal itself Also, because the top quark mass is of the order of the Fermi scale..., the top quark would be useful in probing the symmetry breaking sector. (RA 11)

A cursory look at the above examples reveals that most of these instances apparently prepare the scene for this option by tentatively justifying in some manner the motivation for carrying out the research. The following table indicates clearly a structure employed by the authors to signal this option:

Table 5.3 Structure of Stating Research Value Move

Research orientation	Modal auxiliary	Lexical items indicating Value	Practical or Theoretical Value
1. Research	will	provide	a basis for the planning of nursing program
2. It	will	assist	planners in identifying the need...
3. This study	may	serve	as a basis for further morphological studies.....
4. The top quark	would	be useful	in probing the symmetry breaking sector.
5. The following notes...	may	help	clarify some ideas and conclusions.

This occurrence of this move confirms Weissberg and Buker's (1990) analysis which also identified optional statements that give the value of the experimental research to be reported.

5.3.2.2. Limiting conditions

The present study revealed that the communicative category of 'limiting conditions' was found in the Introductions to 4 RAs, namely chemical engineering, applied maths, statistics and law RAs. The function of this move is to identify the boundary conditions, restrictions, or constraint assumptions under which a piece of research is conducted. These restrictions need to be satisfied or taken into account before solving a suggested problem or running a program. Instances demonstrating this move were generally encountered immediately either before or after Move 3- Step 1. In other words, there seems to be an association between this move and 'outlining the purpose of the study', which generally precedes the above-mentioned additional move, as is shown in the following skeletal examples:

e.g.1. The aim of this paper is to derive the distribution of extinction time and the expected time to extinction for a diffusion model with catastrophes under the assumption that the catastrophe rate is small, and having magnitude... (RA 13)

e.g.2. For tortious liability to exist, three conditions must be satisfied. First,... Secondly,... Thirdly, ... (RA 15)

e.g.3. The total amine concentration was held constant at 50 mass %, and... (RA 8)

e.g.4. The gas is assumed to be inviscid, nonconducting, irrotational, and perfect. (RA 12)

The first two examples introduce the necessary assumptions or conditions to be taken into consideration in solving the suggested problem. Similarly, in instances 3- 4, the authors identified and restricted the constraints and the variables of the experiment.

The examples above indicate that special signalling lexical items are used to indicate this move. Lexical signals such as ‘conditions’, ‘assumptions’, and ‘held constant’ are used for this purpose. The lexical signals are followed immediately by the constraint assumptions or the limiting conditions. This Move seems to be tied to the purposive Move 3 in the sense that the stated purpose could only be fulfilled if the following or the preceding constraint assumptions are satisfied.

The following structure seems to be employed by the authors to state this component:

Table 5.4 Structure of the limiting conditions Move

Research orientation	Lexical signals	Limiting conditions
1.The aim of this paper is to derive catastrophes	under the assumption	that the catastrophe rate is small, and having magnitude...
2. For tortious liability to exist	conditions must be satisfied	First, Secondly, Thirdly,
3. The total amine concentration	held constant	
4. The gas	assumed	inviscid, nonconducting, irrotational, and

5.3.2.3. Indicating research methods

We can now turn to the third additional move, which we have labelled ‘Indicating Research Methods’. The purpose of this move is to give an overview of the methods of investigation or refer to the source of data and sampling techniques on which the research to be presented is based.

Consider the following examples in which the lexical items indicating research methods are underlined:

e.g.1. The present study has been carried out by using the potentiostatic polarisation method. (RA 7)

e.g.2. The TRANSYS simulation program was utilized to simulate the performance of the system using a full year of meteorological data for Los Angeles, California, USA. (RA 10)

In the first example above, the method of investigation was specified whereas in the second instance the researcher presented an overview of his experience with the subjects studied, in terms of the period of study, sample size, diagnosis, method and

place of treatment. The authors of the above-mentioned RAs were asked about the rationale of including this additional move. In their view, this functional move orients the busy reader, who does not have enough time to go over the whole RA, on the particular method of investigation to be used, particularly it is aimed at those readers who are interested in reading the Introduction section only. Besides, the RA writer of chemistry added that he practised this tendency (i.e. closing the Introduction section with this particular move) because he noticed that in most of the chemistry journals he had read there was reference to the procedure to be employed.

5.3.2.4. Providing information

There now remain only a few strings of information that could not be characterised with reference to the moves described in this chapter. The difficulty of including them in any of the above moves resides in the fact that they convey more than one function. These strings are needed only on a few occasions to provide information about the historical background of a problem, a theory, or to provide definitions or preliminaries that are felt to be necessary for understanding the research problem. This move appears as a free standing move given in the place where the term being presented is first used. The constituent elements of this move are the following:

1. Providing background knowledge

e.g.1. Corrosion and passivation of metals in organic solvents is strongly dependent on the water content. (RA 7)

e.g.2. In a thermally stratified tank, cooler water enters the collector from the bottom of the tank, resulting in smaller collecting losses, and higher collector efficiency. The temperature of the water at the bottom of the tank is approximately the temperature of the main. (RA 10)

e.g.3. The “BCCI” was the third bank to collapse this year in Britain. In February, the Chancery Bank went into administration taking with it deposits from 21 local authorities worth £26m. The merchant Bank Edington closed in the same month at a cost of around £14m. to seven local councils, according to the Association of District Councils. (RA 15)

e.g.4. Medicinal plants have been prescribed and used for centuries in Jordan,... (RA 5)

e.g.5. Jurists refer to precedents and practices to accept, modify, or reject. They try to find in the Qur’an,..... some guiding lines. (RA 16)

In the first example, the author makes a statement about the theoretical background knowledge and the conditions of the research topic to be presented, whereas in the second instance, the authors provide a theoretical background of the function of the new terms employed in this section, i.e. the function of a ‘thermally stratified tank’. In the third example, the author provides the reader with background information about the other two banks. However, after due consideration of the third text, a reader may think of other alternative interpretative analyses such as *Establishing a territory by reviewing items of previous literature*. The possible candidate for the competing interpretation, *reviewing items of previous literature*, is the closing phrase ‘according to the Association of District Council’.

In the fourth example, the authors provide a historical background about the topic to be presented. The prepositional phrase ‘for centuries’ indicates this interpretation. The last instance provides information about the practices and procedures the jurists refer to.

2. Providing definitions

e.g., **Definition 2.** By a *derivation* of an algebra A is meant a linear operator D on A satisfying... (RA 14)

According to the RA author’s view, the above step does not belong to the Introduction section and is dealt with in a separate section. However, the definitions provided have not been given a different serial number to that of the Introduction. They are included in the Introduction, which was given number 1, whereas the Results section was given number 2.

3. Theoretical modelling

This step includes providing the reader with preliminary mathematical models including mathematical treatment and transformations, equations and their notations that are felt to be necessary to the solution of the problem. This option is employed mainly in maths. Consider the following example:

Consider the process which has a small catastrophe rate ν . For times $t = 1, 2, 3, \dots$, each time interval the process either goes from $x \rightarrow Bx$ with probability ν or diffuse (with no jumps) from $x \rightarrow x$ with probability $1 - \nu$.

The one step transition density is then

$$p_1(x, y) = \nu dH_z(y) + (1 - \nu) p_x^1(x, y)$$

where

$$dH_z(y) = \dots$$

where ...

The parameters a and b are called the diffusion and the drift parameters, respectively.
(RA 13)

The components of the above model are the following:

1. Stating the model in equations

The constituent elements of the equations which in turn constitute the model are the two already known models, the diffusion model and the beta model.

2. Mathematical rephrasing of the model

Each of the constituent elements of the model is mathematically rephrased in details. The lexical underlined 'where' item is used to indicate this step.

3. Mathematical notations

This component includes definitions of the new terms in the equations.

5.3.3. Disciplinary Move Structure Variations within Introductions

Attention is now turned to a concluding view of the global structure of the Introduction texts of the investigated RA corpus. As demonstrated earlier in the Methodology Chapter, the move structure of the theoretical physics RA 1.3- 2.1- 4- 3.1- 3.3 in the table below indicates that the RA writer initiated the Introduction section with 'Reviewing items of previous research', followed by 'Indicating a gap', and proceeded to 'Stating research motivation' then to 'Outlining a purpose', and closed the Introduction by 'Indicating RA structure and content'. Each sequence of numbers within the round brackets represents a move cycle. The numbers next to the RA Introductions correspond to the moves contained in the sections, whereas a number followed by a decimal number, for example '3.1' represents a constituent step of a move.

It is clear from the analysis of the RA corpus Introduction sections above, that the RA introductory segments examined feature differences in their move structure. The following table reveals these variations:

Table 5.5 Move structure of RA Introduction sections

RA	Structure (Moves)	No. of Move units
Paediatrics	1.2- 1.3- 2.1- 1.3- 2.1- 1.3- 3.1	6
Anatomy	1.1- 1.3- 5- 2.1- 3.1- 4	5
Surgery	1.2- 1.3- 2.3	2
Nursing	1.1- 1.3- 2.1- 3.1- 4- 1.3- 1.4- 2.1	6
Pharmacy	7.1- 1.1- 1.3- 2.3- 3.1	4
Zoology	1.2- 1.3- 2.1- 3.1	3
Chemistry	1.1- 1.3- 7.1- 4- 3.1- 6	5
Chemical Engineering	1.2- 1.1- 4- 1.3- 2.1- 3.1- 5	6
Electrical Engineering	(4- 2.1- 3.1) (2.1- 4- 3.1)	6
Physics (Applied)	1.2- 1.3- 1.4- 7.1- 2.1- 3.1- 6	5
Physics (Theoretical)	1.3- 2.1- 4- 3.1- 3.3	5
Mathematics (Applied)	1.1- 1.3- 3.1- 5- 7.3- 5- 7.3	6
Mathematics (Statistics)	1.3- 3.1- 5- 3.2- 7.3	5
Mathematics (Algebra)	1.2- 1.3- 3.1- 3.2- 7.2	3
Law	2.2- 7.1- 3.1- 5	4
History	3.1- 1.1- 7.1- 2.1- 4	5

The results of the move-structure analysis of RA Introduction sections revealed the following most common moves to occur in the sample.

- 1- Establishing a territory
 - 1.1- Claiming centrality
 - 1.2- Making topic generalisation(s)
 - 1.3- Reviewing items of previous research
 - 1.4- Discussing previous research
- 2- Establishing a niche
 - 2.1- Indicating a gap
 - 2.2- Question raising
 - 2.3- Continuing a tradition
- 3- Occupying the niche
 - 3.1- Outlining a purpose or Announcing present research
 - 3.2- Announcing principal findings
 - 3.3- Indicating RA structure and/or content
- 4- Stating research motivation
- 5- Limiting conditions/ or constraint assumptions
- 6- Indicating research methods
- 7- Providing information
 - 7.1. Background information
 - 7.2. Presenting definitions
 - 7.3. Theoretical modelling

As is shown in Table 5.5 above, this difference in structural patterns across disciplines is demonstrated in the number of moves encountered and the order of presentation, as well as the type of moves included. As found in the analysis, the number of moves in each RA Introduction varies. For example, paediatrics and applied maths RA Introductions contain six moves, while the surgery RA has a two move Introduction. It is interesting to notice the absence of a few of Swales' prescribed moves, and that some moves are more common than others. For instance, Move 1 is more common than Move 2. In contrast, we noticed the absence of Move 1 from law and electrical engineering RAs. Similarly, the *Establishing a niche* move is absent from chemistry, applied maths and statistics RAs. Besides, the surgery RA demonstrated the absence of *Occupying the niche* move although this move, according to Swales view, tends to occur as an obligatory move in the RA introductory segments.

Another observation is related to the Introduction closing moves. Although Swales argues that RA Introductions are closed with the *Occupying the niche move*, in the present cross-disciplinary corpus, the number of RAs closing with other moves (11 Introductions) is higher than that of those closing with Move 3.

However, most of the RA writers show an obvious preference for including the constituent moves of the Swalsian pattern and generally in the same order 1- 2- 3.

The study has also exhibited that the RA writers tend to employ other moves in addition to those proposed by Swales' 3- Move model for the Introduction sections. The other rhetorical moves identified in the corpus are adopted by the RA writers to justify the author's research value; to provide background information including definitions, concept clarification, and mathematical preliminaries; to highlight the methodology used; and to specify under what conditions or constraint assumptions the research is carried out.

Similarly, other genre analysts have identified additional moves that have not been documented in Swales' model of Introduction sections. For example, Cooper (1985), and Crooks (1986: 67) suggested an additional move whose function is to present 'general, non-referential theoretical background' which corresponds in function to 'Background information' move identified in the present study. Likewise, Nwogu (1997) distinguished 'Reference to main research procedure' which also bears similarity to 'Indicating RA methods' encountered in our corpus. Similarly, according to Day's (1994) prescriptions, the research methods of the study should be referred to in the Introduction section. 'Stating research motivation or value' isolated in the present

corpus also resembles in function a similar component identified by Weissberg and Buker (1990) and Cooper (1985). They noticed that RA writers include in the Introductions, statements that highlight the value of the experimental research to be reported.

In addition, the linguistic exponents that are used by the RA writers to indicate an arrival at the following moves show some resemblance to those put forward by Swales (1990). It is worthwhile noting that most of the linguistic exponents used are lexical rather than grammatical signals. It is very difficult to depend on the grammatical components alone to identify the moves because even the same functional move can be expressed by different linguistic forms. Furthermore, I have encountered a few cases where a sentence contains more than one functional move, and a clause is likely to convey more than one function.

It is quite obvious that RA writers demonstrate a preference not only for violating Swales' prescribed move order, but also show a tendency to include other communicative components not documented by Swales' model so as to meet the new communicative functions required by disciplinary variations *or to fulfill rhetorical* purposes specific to the communicative needs of the discourse in hand.

5.4. Move Structure of Methods sections

The previous section examined the rhetorical organisation of 16 RA Introduction sections across a variety of disciplines. Due to the absence of a reference model of Methods move structure analysis, I attempted to adapt Swales' (1990) model by extending it beyond the RA Introductions to the Methods sections.

In this section I will present the move structure analysis of the same 16 RAs' Methods sections. I will introduce an outline of the overall rhetorical moves that researchers from various disciplines employed to organise their Methods sections or other equivalent nomenclature adopted by the authors of the RAs for these particular sections. Then I will look in detail at each of these moves and their constituent options together with the linguistic exponents associated with them. After that I will introduce an illustrative outline example of an anomalous RA Methods section. Finally, a discussion of the type, number, order of the moves, and move structure variations as well as the move structure complexity and cyclicity is presented towards the end of this section.

5.4.1. Moves of Methods sections

The results of the analysis of the Methods sections in the present RA corpus revealed that the authors resort to the following list of moves to organise the Methods sections or any other equivalent nomenclature used. Moves 1-8 occurred in most of the RAs having a Methods section, whereas the moves 9-16 in bold type were encountered in the RAs having anomalous Methods sections.

1. Describing experimental procedures: This move contains the following components:

- 1.A. Citing procedures
 - 1.B. Recounting experimental procedures
 - 1.C. Presenting a mathematical treatment
 - 1.D. Biological testing
 - 1.E. Describing intervention or treatment protocol
 - 1.F. Statement of ethics
- 2. Sampling procedures
 - 3. Limiting conditions and constraint assumptions
 - 4. Identifying materials and components
 - 5. Describing a design or an experimental set-up
 - 5.A. Locating components
 - 5.B. Describing a function or an operation
 - 6. Sign-posting
 - 7. Describing data collection procedures
 - 8. Describing data analysis procedures
 - 9. Verification**
 - 10. Identifying a procedural gap**
 - 11. Referring to supporting data**
 - 12. Statement of result/finding**
 - 13. Explanation**
 - 14. Recommendation**
 - 15. Claim**
 - 15.A. Hypothetical conclusion
 - 15.B. Deduction
 - 15. Stating overall research outcome (Summarising)**

The scope of each of the above moves is demonstrated and is followed by a description of its purpose, with examples taken from the corpus.

5.4.1.1. Describing experimental procedures

The ‘Describing experimental procedures’ move functions primarily to identify the specific procedural steps adopted to conduct research. Experimental methods should be described in enough detail to permit duplication of the data by other peer researchers in the field. However, standard and published procedures need not be described, but a

readily available reference should be cited. This move appeared as a quasi-obligatory component of the Methods sections across the various disciplines, especially in the research articles that tend to include the Methods section or any other equivalent nomenclature. It contains a number of exponents or constituent options, such as citing procedures, recounting experimental processes, presenting a mathematical treatment, biological testing, describing intervention or treatment protocol, and ethical issues.

A detailed analysis of the Methods section of the sample revealed that the RA writers tended to employ one or more of the following options given below.

5.4.1.1A. Citing procedures

In the following representative examples of this option, the methods employed and the source of reference are underlined, whereas the verb voice is written in bold type. Swales and Feak (1994: 164- 166) use the term ‘fast’ to describe standard and established methods. They comment that RA writers who do not describe the procedures assume that the readers have sufficient background knowledge of these procedures.

e.g.1. Employing Tan and Bianchi’s technique¹, the abdomen was prepared with povidone iodine solution ...

A classical pyloromyotomy **was carried out** as described in the operative surgical textbooks [2,3]. (RA 3)

e.g.2. All chemicals and procedures were identical to those described by Maron and Ames (1983). (RA 5)

e.g.3. Thick blocks ... **were dissected** from the hypothalamus and **processed** according to the Golgi method described by Fox et al8. (RA 2)

e.g.4. A description of the experimental set-up and procedure used together with the data reduction methodology **has been given** in detail in a previous paper (3). (RA 8)

e.g.5. A detail Monte Carlo study on the measurement of these couplings at the NLC including detector effects and initial state radiation **can be found** in Ref [29]. ... Taking the chiral lagrangian approach [4-13], (RA 11)

From the examples given so far, it becomes clear that when a standard procedure is carried out, researchers simply name and reference that procedure rather than describe it in detail. Of particular interest is the use of the passive voice as is indicated by the instances in bold type encountered in the analysed sample.

Most of the authors of the RAs indicated that they simply name and reference procedures without a further description because, according to them, these are standard procedures, which are accepted and supposed to be known by other peers.

5.4.1.1B. Recounting experimental processes

As can be intimated from the following two instances, there is clearly a predominating tendency that when a new procedure is followed it is described fully to show the reader how the plan of action is carried out, step-by-step, in a logical, chronological and sequential order. It may recount experimental processes to tell the reader ‘when’, ‘where’, ‘how’, ‘by whom’, or ‘to whom’ something was done.

The following examples illustrate the step-by-step description of the experimental procedure. The description is relatively detailed and apparently reflects the chronological order of the experimental processes. The procedural sequence is signalled principally via adverbs of time such as *before*, *after* and *then*, and realised by the use of the passive voice.

e.g.1. A Ti electrode (99.6%) of surface area 105mm² **was inserted** into a Teflon holder. Before each measurement, the Ti electrode was abraded with 400, 600, and 1000 emery paper and then **degreased** with acetone.... The measurements **were performed** in 1M HCl.. Appropriate amounts of water (0, 1, 2, 3, 4,...) **were added** to the above solution to obtain mixed methanol- water solvents. (RA 7)

e.g.2. After Golgi silver impregnation the blocks **were embedded** in paraffin wax. ... The sections **were then cleaned** ... (RA 2)

Unlike the former category, the above examples can be categorised, according to Swales and Feak (ibid.), as ‘slow paced’ because they do not assume the same level of shared knowledge on the part of the readers.

5.4.1.1C. Presenting a mathematical treatment

Beside naming standard procedures or describing a newly introduced technique in enough detail, researchers sometimes name or cite familiar mathematical models and provide a brief description of the mathematical treatment simultaneously including the modifications or adaptations the researchers made for use in their studies. Researchers

tend to write the cited model in a series of steps using equations, mathematical notations and substituting equations as is shown in the following skeletal example.

e.g.1. The method of multiple scales [6] is employed to determine a first-order uniform solution to Eqs. (6) and (7).

Asymptotic expansions of solutions are written as

... (8)

The derivatives with respect to x become

... (9a)

...(9b)

We substitute Eqs. (8) and (9) into Eqs. (6) and (7) and expand in Taylor series for boundary conditions (B.C.) around $y=1$ with increment ...(RA 12)

e.g.2. The thermal performance of a flat-plate collector is modeled according to the Hottel-Whillier equation:

... (1)

where r , is the modification coefficient (flow rate correction factor), by which ...and ... are corrected, is given as [13]

.... (2)

The collector is divided into a number of segments and nodes (we used 20 nodes) normal to the flow rate direction. The temperature at the midpoint of any node k in the collector is [8]

.... (3) (RA 10)

e.g.3. Taking the chiral lagrangian approach [4-13], we systematically parameterize the interactions of the top quark to gauge bosons at low energy using an effective lagrangian with the non-linear realization of the symmetry... [14]. In the unitary gauge, it is

.... (1)

where SM is the SM lagrangian... and the superscript NC and CC denote neutral and charged current, respectively. (RA 11)

If we consider the above examples we notice that the RA writers made use of known mathematical models and applied them to their collected data. In other words, they did not create a new mathematical model. This component move tends to include the following constituent elements:

1. Naming a model and/or referring to source citation,
2. Mathematical equations, mathematical notations, and calculation outcome.

Another observation concerns the use of tense. We notice that the tense is generally restricted to the simple present when the researchers present the above option.

5.4.1.1D. Biological testing

Writers may attempt to check effects and side effects of prepared materials or samples (drugs) on human or non-human subjects, such as microbes, shrimp or human tissues; this step is called 'Biological testing' as is shown in the following example.

e.g. Cytotoxicity of the brine shrimp active samples was determined in the Purdue Cell Culture Laboratory... against the human cell lines A-549 (lung carcinoma), ...(breast cancer)... (RA 5)

5.4.1.1E. Describing intervention or treatment protocol

This option includes a description of the treatment the researcher will give, the change made by this treatment and an evaluation of this change.

e.g., Children were allocated by alternating assignment to either the treatment or placebo group. Subjects allocated to the treatment group were given ferrous sulfate solution ... (RA 1)

5.4.1.1F. Statements of ethics

Included within the domain of the procedural description is a brief on the procedure for approaching the individuals and gaining their consent to participate. For the protection of human subjects, researchers who operate on human beings require participants' consent to be included in the study, along with an approval from the ethical committee. There are only two instances of this component. Consider the following text that gives an illustrative example:

e.g., An informed consent was obtained from the guardians of patients. The study was approved by the ethical committee of the Jordan University of Science and Technology. (RA 1)

5.4.1.2. Sampling procedures.

Most of the exemplars of this move were encountered near to the opening of the Methods section. Here, the author may include information about what population he intends to include, the source and setting of the sample, sample size and characteristics, criteria for sample selection (whether randomly, purposely etc.), inclusiveness or exclusiveness of data, and the method of assigning samples to groups. In the following examples, the lexical items indicating these segments of information are underlined.

e.g.1. The information investigated in the present study was assimilated from the records of five Jordanian hospitals for the 11 years 1976-1986: (1) Departments of Surgical Pathology,...; (2) King Hussien Medical Centre,... All reports documenting cases of hydatid cysts ...were extracted. (RA 6)

e.g.2. The required hourly meteorological data (solar radiation and dry bulb temperature) for Los Angeles were taken from the Typical Meteorological Year (TMY) data bank. (RA 10)

e.g.3. Twenty-two infants aged between 18 and 60 (mean 33) days were diagnosed as having IHPS,... There were five girls and 17 boys. (RA 3)

e.g.4. Brains from six non-neurological adult individuals (four males and two females, aged between 20 and 50 years) were cut into slabs.... (RA 2)

e.g.5. The participants were drawn randomly from all nonmilitary nursing programs in Jordan. All nursing students ($N = 822$) with odd registration numbers from two baccalaureate programs ($n = 552$)... were invited to participate in the study. (RA 4)

e.g.6. All children with BHS attending Princess Badia's Children's Teaching Hospital during the period from June 1992 to June 1995 were considered for inclusion in the study... The type of spells was classified according to skin color change of the child during the episode into cyanotic, pallid, and mixed... Before the study, it was decided to exclude patients with any of the following conditions:.. (RA 1)

In the first and second examples above, information about the source of the sample was indicated by the preposition *from* followed by its specified source. Criterion of inclusion for the data is signalled, in the first example, by explicit lexemes *for 11 years 1976- 1986*. Inclusiveness of data was indicated by the lexical item *all*. The third instance embodies information indicating sample size and sample selection. In the fourth instance, the authors initiated this section by providing information about the subjects including sample size, and information about the sample such as 'age' and 'sex'. In the fifth and sixth examples, the authors provided information including the source and setting of the sample, criteria for sample selection, and assigning subjects to groups.

It is worthwhile noting that the past passive is used to indicate the sampling procedure instances that occurred in the present RA corpus.

5.4.1.3. Limiting conditions

In 6 out of the 12 RAs, which included the Methods section, the authors indicated the conditions and constraints to be satisfied in conducting a particular piece of research. Lexical items indicating constraint assumptions and limiting conditions under which the research is conducted are underlined as shown in the following examples:

e.g.1. Measurements were carried out at room temperature (20°C). An aqueous saturated calomel electrode was used as reference electrode ... The distance between the working electrode and Luggin capillary was kept constant and equal to 4mm. (RA 7)

e.g.2. To constrain these non-standard couplings we need to have both the experimental values and the SM predictions ... (RA 11)

e.g.3. The N₂O gas used in this research was of medical grade with a purity greater than 99.99%. The DEA used was of reagent grade with a purity greater than 99%. (RA 8)

e.g.4. Two types of the components..., are programmable and need to be configured before the card can start its operation. Moreover,... Also,..., an interface program ... must be available. Finally, more software needs to be written if the card is to have more intelligence or when it is needed to be used ... (RA 9)

e.g.5. In modeling the storage tank using TRANSYS, the primary variable to specify is the number of nodes or segments into which to divide the tank. This governs the degree of stratification that will result. If only one node or segment is chosen, the tank will be modeled as uniformly mixed at any instant of time. If the number of segments is sufficient (at least 20 segments [9]), this permits a maximum degree of stratification. (RA 10)

The authors constrained the conditions and the environment of the experiment as is mentioned in the first three instances. They identified the special conditions under which they conducted their research. Similarly, the authors in example 4 provided a list of conditions that should be satisfied in order to get the software design started, using signals of sequence (Moreover, Also, Finally) and modal auxiliaries indicating obligation. In addition to the use of the lexical signals and modal auxiliaries, the authors in the fifth instance employed conditional clauses initiated by 'if' to indicate the conditions that should be met in order to run the program. The above examples are further illustrated in the following table.

Table 5.6 Structure of the Limiting conditions Moves

Variables	Lexical signals	Restrictions
1. Measurement, the distance...	Kept constant	at room temperature (20°C). kept constant
2. non-standard couplings	Constrain, need to	Experimental values and the SM
3. The N ₂ O gas used The DEA used		Of medical grade with a purity greater than 99.99%. Of reagent grade with a purity greater than 99%
4. Before the card can start its operation	Need to, needed, must be available, moreover, also, finally	Types of the components... need to be configured
5. In modelling the storage tank using TRANSYS	the primary variable to specify, governs, Conditional <u>if</u> clause	The number of nodes or segments

5.4.1.4. Identifying materials or components

This move indicates which substances, equipment or principal components were used to carry out an experiment. A justification of the use of materials may also fall into this move.

e.g.1. It is rather straight forward to propose an interface... **incorporating** an analog-to-digital converter (ADC), a latch to save a digital sample unit..., and timing and control circuitry. Such an interface would **comprise** MSI/SSI... (RA 9)

e.g.2. A schematic diagram of the system investigated is shown in Fig. 1. It **consists of** a flat-plate collector (RA 10)

e.g.3. To provide reasonable accuracy for many applications, it is suggested to use a 12-bit ADC, and is selected. (RA 9)

e.g.4. In order to read the digital samples..., a minimum of 12-bit buffer is needed to hold the data ... (RA 9)

e.g.5. We propose using a two programmable interface chips which provide ... (RA 9)

e.g.6. A wetted-sphere apparatus was used in this research. (RA 8)

e.g.7. The cell used in the present investigation has been described elsewhere.⁴ (RA 7)

The first and the second examples above identify the equipment used and its main components.

In examples 3-5, we notice that the authors describe the functionality or purpose of the component, which is signalled by ‘to-infinitive’ constructions or relative clauses. In instances 6 and 7, the materials are only identified.

5.4.1.5. Describing a design or an experimental set up

This move includes the following constituent elements:

A) Locating components, in which writers provide a schematic description of the configuration and the location of the various parts of a piece of equipment or design and describe how these components are arranged or connected spatially together.

B) Describing a function or an operation, in which writers describe the function or operation of each component of a design and how these components operate together in order to get a design started.

The above-mentioned constituent functional steps identified in our corpus bear some resemblance to those identified by Weissberg and Buker (1990).

Consider the following illustrative examples, in which the parts connected are underlined and the lexical signals of spatial connection description are written in bold:

e.g.1. It [The system] consists of a flat-plate collector **connected to** a vertical storage tank. The bottom of the tank is level with the top of the collector. An electric auxiliary heater and thermostat are placed 5 cm down from the top of the tank...(RA 10)

e.g.2. The eight data lines of PPI-1, PPI-2, and the timer **are connected with the corresponding lines coming from the bus** via a bi-directional 8-bit bus transceiver (74LS245). Lines controlling the PPI's... **are taken from the bus ...** (RA 9)

The authors, in the original texts from which the above examples were extracted, gave a detailed description of the schematic diagram. That is to say, they described the configuration of the designs implemented, how the constituent parts of the system or the design are connected together and where each part is located. Spatial description of the located components in the above examples is signalled lexically by ‘connect’, ‘placed’, ‘coming from’, and ‘taken from’ which indicate direction and the preposition ‘from’ which signals location. Besides, the simple present or present passive is also used.

The authors, in instances 3-4 below, provided a description of the function and the operation of each part of the model and how these parts function together.

e.g.3. When the ADC finishes conversion of this sample from the selected channel, it informs PP-I The PC then reads the converted sample. The programmable interval

timers are set initially... . When the PC finds that a channel needs to be serviced, it writes a control word ..., which in turn selects this channel. until they are processed. (RA 9)

e.g.4. This module interacts with the user,... . It then calls other modules to initialize hardware and perform data collection. (RA 9)

As is shown in the above instances, the RA writers presented the components in a fixed chronological sequence, i.e., in the order in which they function. They used linguistic devices, such as verbs of action (e.g., interact, perform, finish, etc.), temporal ordering adverbials such as ‘initially’ and ‘then’ describing the chronological sequence of the operation of the design to signal information in this move.

Each of the above-mentioned examples, 1-4, provides either a functional description or a spatial arrangement of the components of the modules, each of which is considered as a sub-program. These moves also show how these various connected sub-programs, which constitute the main program or design, function together and in a fixed order. Information in this move requires the use of the simple present tense.

Tied to the ‘Describing a study design or an experimental set-up’ move is Move 4, ‘Identifying materials and components’ which provides a preview of the names of the materials or the constituent components to be described, later, either spatially or functionally. The above-mentioned ‘Identifying materials and components’ move very often combines with the present move and immediately precedes it. Sometimes, it is very difficult to differentiate between these two moves, because the constituent components of a system or a design are themselves the materials that needs to be identified and prepared to build and operate the system.

Thus the RA corpus analysis faced the problem that some functional move labels may be overlapping. For example, ‘Describing a study design’ move may include an element of the ‘Identifying materials and components’ move.

5.4.1.6. Sign posting

This is a one or two sentence skeletal overview that gives a general idea of what the writer will do, and how he plans to achieve his purpose; in other words, it provides a scaffolding on which writers hang the details of what follows. For example, the authors

may outline the procedures to be followed in each move cycle. This move tends to occur towards the beginning of the Methods section or at the onset of new cycles.

e.g.1. **In this section we propose** a particular design to the interface hardware, together with a possible implementation. For this purpose **we** choose hardware components The following are the main components of the interface ... (RA9)

e.g.2. **In this section, we study** how to constrain the non-standard couplings of the top quark to gauge bosons from direct detection of the top quark at hadron colliders. (RA 11)

e.g.3. **Here we propose** to probe the couplings ... by measuring the production rate of the single top-quark events. (RA 11)

The above three instances indicate that the onset of this move is marked by the use of a deictic reference to the present text, such as, this, here, and we. The simple use of the expression of purpose is apparently an indication that the section is now opened. The use of lexical items like ‘purpose’ and ‘propose’ indicates the intention of the writer. Information signalling this move, in the first two examples, is carried out by a preliminary prepositional phrase starting with in whereas in the third instance it is indicated by the place adverb relater which involves ellipted items understood from the context of situation. In other words, *Here* in [3] implies ‘in this section’. A move to a new section or a new move cycle seems to be signalled by an introductory phrase either prepositional or place adverb relater, reinforced by the use of a personal deictic reference we. Fourth, the occurrences of this move have a present tense verb.

It is worth pointing out that this move bears some similarity, in function and the linguist exponents signalling this function, to the *Occupying the niche* move encountered in the Introduction sections.

5.4.1.7. Describing data collection tools

This move tells what the researcher will measure or collect, and what instrument or tool (e.g. questionnaire, or interview) was employed to collect what type of data. Illustrative examples are the following:

e.g.1. We used the Fundamental Interpersonal Relations Orientation Behavior Test (FIRO-B) to assess the interpersonal behavior of the participants. It was developed by Schutz (1978) to measure three fundamental dimensions of interpersonal behavior: inclusion, control, and affection. The Inclusion dimension assesses a person’s need to associate with others, the Control dimension assesses the person’s need to dominate

people or influence relationships, and the Affection dimension assesses a person's need to become emotionally involved with others...

The FIRO-B consists of 54 items, 9 on each of the six measures: Expressed Inclusion, and Wanted Inclusion, Expressed Affection and Wanted Affection, and Expressed control and Wanted control... (RA 4)

e.g.2. The mean diameters of somata, as well as of dendrites of different orders were measured with an ocular micrometer. (RA 2)

This step is expressed by the lexical lexemes such as 'measured', micrometer and 'mean'.

As is shown in the first instance above, the authors define the measuring instrument and mention its constituent elements, validity and reliability, despite the fact that the data collection instrument is well known, and not adapted or developed for the present research purposes. However, such a standard test is supposed to be only cited because such information is assumed to be a shared knowledge on the part of peers. Thus, the first author of the nursing RA was asked about the rationale of including a detailed description of the instrument used in the Methods section. She argued that this detailed explanation is requested by the editor so as to familiarise the audience with this technique because this procedural instrument is frequently employed in an area of interest other than Nursing.

5.4.1.8. Describing data analysis procedure

Researchers tend to describe the *technical operations and the statistical treatment* they went through to analyse their data. This move includes naming the statistical package used, the significant tests and data measurement, classification and tabulation. Consider the examples below:

e.g.1. Data were entered into the computer with database three plus software. Analysis was carried out with the Statistical Analysis Systems software (SAS...)... (RA 1)

e.g.2. The demographic data for these cases, ..., were re-recorded and tabulated. (RA 6)

5.4.1.9. Verification

In this move, the author tests the performance of the design or the system to make sure that it behaves properly under the limiting conditions and the constraint assumptions that have been specified to conduct research. Information in this move is expressed via one or more of the following constituent options:

5.4.1.9.1. Testing the performance of a system;

e.g.1. The performance of the system **was calculated** for a full year with a daily load of 250 l supplied only on the widely used Rand hot water profile. (RA10)

e.g.2. The hardware and software described above **have been tested** on various signals. (RA 9)

e.g.3. Note that the couplings of light-fermions to W boson **have been well tested** from the low energy data to be left-handed as described in the SM. This difference becomes smaller when the top quark is more massive ... (RA 11)

5.4.1.9.2. Reference to previous research

The writers attempt to refer to similar findings of other researchers who have already employed such experimental procedures and produced successful results to assure their readers that the system's performance concords with scientific practice.

e.g. Fanney and Klein [7] used this load scheme in their measurements and predictions of the performance of six domestic solar hot water systems at the National Bureau of Standards.

Information in this move tends to be expressed by means of explicit lexemes such as 'performance', 'calculate', and 'test' as is shown in the above examples. This move occurred in applied physics and electrical engineering RA sections.

In the interview, I asked the electrical engineering RA author why the above move was not included in a Discussion section. He argued that they do not need to provide lots of justifications, explanations and exemplification because what they are after is the functionality of the designed hardware and whether the system works within the conditions in which they claimed it would behave properly. Thus, in his view, 'seeing is believing'. However, he pointed out that he usually compares his algorithm with those of other researchers, when he talks about a proposed algorithm, to show that he is doing things within the norms or he has come up with a better solution.

5.4.1.10. Identifying a procedural problem

In this move, the authors draw attention to a problem in the experimental procedures presented. This move is often tied to the 'Describing experimental procedures' move discussed earlier in this section. That is to say, the experimental procedure proposed

constitutes a general context within which the new problem (i.e. the current move), is identified. These two moves have much in common with the component parts of Hoey's (1983) 'problem - solution model'. After identifying the problem, authors may go further to include the causes of the problem, which in turn establish a context for a solution presented principally in the form of an alternative procedure. Following are two skeletal texts to show how the identified problem is situated within a previously suggested procedure, and how this problem emerged out of applying that particular experimental procedure.

Table 5.7 Text (1) showing Identifying a procedural problem Move

Move	Text (Signals are my emphasis)	Cycle
Describing experimental procedures	Lagrangian approach (suggested procedure)	Cycle One
Identifying a procedural problem	1. <u>Non-renormalizability</u> of the effective lagrangian [approach] presents a major issue of how to find a scheme to handle both the divergent and the finite pieces in loop calculations [20,21].	
Identifying the causes of the problem	2. Such a problem arises because one does not know the underlying theory, hence no matching can be performed to extract the correct scheme to be used in the effective lagrangian [22].	Cycle Two
Describing experimental procedures	3. One approach is to associate the divergent piece in loop calculations with a physical cut-off Λ , the upper scale at which the effective lagrangian is valid [9].	
Identifying a procedural problem	4. In the chiral lagrangian approach this cut-off Λ is taken to be...[22]. 5. For the finite piece no completely satisfactory approach is available [20].	

As is shown in the table above, cyclicity of the moves, 'Identifying a procedural problem', and Move 1, 'Describing experimental procedures' sometimes occurs. Each cycle consists of one aspect of procedure and its associated problem. By this I mean that the above text can be analysed as follows: Sentence 1 'Non-renormalizability of the effective lagrangian' contains anaphoric reference to the 'lagrangian approach' or procedures mentioned and described by the researcher in the previous text. 'Non-renormalizability', lexically, signals a particular problem in those procedures. Likewise,

sentence 2 contains anaphoric reference to sentence 1 in the phrase ‘such a problem’. It is a lexical signal indicating a procedural problem in the Move, and in this case can be taken backwards to characterise sentence 1 as an ‘Identification of a procedural problem’ move. Following the lexical signal of the ‘problem’ are the reasons that are spelt out immediately after the cause conjunct ‘because’ in sentence 2. The first cycle is closed here, by identifying the causes of the procedural problem. The following move cycle starts with a response to the aforementioned problem by describing an alternative procedure. The initiating sentence in this cycle, sentence 3, can be identified as carrying the response signalled by the phrase ‘one approach’. Sentences 4-5 will be read as providing the idea that the proposed procedure has its problems. This is indicated by the negative quantifier ‘no’ in sentence 5. The lexical items ‘approach’ and ‘cut off’ repeated in sentence 4 are those items constituting the specified described procedure of sentence 3. They are repeated to provide an explicit context carrying the aspects of the new problem in sentence 5.

Table 5.8 Text (2) showing Identifying a procedural problem Move

Move	Text	Cycle
Identifying a procedural problem	1. However , in reality, the momenta of the bottom quark and the charged lepton will be smeared by the detector effects and the most serious problem in this analysis is the identification of the right <i>b</i> to reconstruct <i>t</i> .	Cycle 1
Describing experimental procedures	2. There are two strategies to improve the efficiency of identifying the right <i>b</i> . 3. One is to demand a large invariant mass... 4. Another is to identify the non-isolated lepton...5. Both of these methods will further reduce the reconstructed signal rate by an order of magnitude.	
Identifying a procedural problem	6. How will these affect our conclusion on the determination of the non-universal couplings...? 7. This cannot be answered in the absence of detailed Monte Carlo studies.	Cycle 2

The text above can also be identified, as constituting a procedural problem, which needs a solution, presented in the form of experimental procedural description. The grounds for the analysis are given below. The signalling phrase ‘the most serious

problem’, in sentence 1 above, anticipates that what follows will provide details of a problem in the procedures. The adversative sentence-connector ‘However’ which indicates that the clause contains information incompatible with the previously presented procedures, is another signal. The purposive clause ‘to improve the efficiency’ becomes a statement of need of a new method or procedure that has to be implemented. Another relevant lexical signal of procedures is the phrase ‘Both of these methods’ in sentence 5, ‘Both of these methods will further reduce the reconstructed signal rate by an order of magnitude’. It refers anaphorically to sentences 2-4 and retrospectively characterises the methods to be adopted positively. It can be seen that in sentences 6 and 7 another chain of consequence has been set up. They comprise an identification of a procedural problem. A number of signals of the problem are present. To begin with, in sentence 6, a question is raised which needs an answer. It implicitly indicates that a problem needs an answer, or a solution. In the following sentence, 7, we have negation in the verb phrase ‘cannot be answered’, and noun lexical negation in the lexical item ‘absence’.

5.4.1.11. Referring to supporting data

This move has a metadiscoursal function, namely, locating the visuals and non-verbal data to be presented and commented on. Authors tend to refer to visuals to support written information presented. This move is usually encountered in the Results and Discussion section; however, nine instances encountered in the Methods sections have been assigned to this move. It probably contains two constituent options such as ‘referring to a schematic diagram of a system’ and ‘locating the findings’. Instances of this come from the RAs of applied physics, and electrical engineering. The examples are generally tied to Move 5, and they occurred either immediately before or after it. They contain references to figures and tables. The lexical items ‘figure’ and ‘table’ as well as the verb phrases ‘is/are shown, presented’ tend to be used in the present corpus to signal the occurrence of this move. The corpus contains these instances:

e.g.1. A schematic diagram of the system investigated is shown in Fig. 1. (RA 10)

e.g.2. The TRANSYS program contains simulation models of subsystem components ... This component uses the parameters shown in Table 2. (RA 10)

e.g.3. A full description of the system is presented in table 2. (RA 10)

e.g.4. Fig. 2 shows a detailed schematic diagram of the interface card which was implemented. (RA 9)

e.g.5. A picture of the card with the circuit of which it was built on, is shown in Fig. 3. (RA 9)

e.g.6. The two-dimensional projections of this slice are shown in Figs. 1-3.(RA 11)

On the other hand, the other two instances 'locating findings' are similar to those encountered in the Results and Discussion sections, in the sense that they occurred immediately either before or after 'Statement of result/finding' move. Authors refer to the visuals containing data to support their findings. Here follow the two instances encountered in the pure physics RA.

e.g.7. We **found** that for a 175 GeV top quark are well constrained inside the region bounded by two (approximate) ellipses, as shown in Fig. 4. (RA11)

e.g.8. These non-standard couplings (the k 's) **do exhibit** some interesting features: This is clearly shown in Fig. 3 which is the projection of the allowed volume...(RA11)

5.4.2. Anomalous RA Methods Sections.

I have made so far some fairly bold claims about the moves that tend to occur in the Methods section across a range of fields. I have encountered 11 rhetorical options that are available to the RA writer to choose from to organise the Methods section or any nomenclature equivalent to this section. However, the study demonstrated that the RA writers from electrical engineering and pure physics often employ a more elaborate rhetorical move structure than is provided above. For example, the sections following the Introductions of these particular RAs can be framed as Methods sections. However, the authors do not use this term. Similarly, computer science RA writers, as reported by Posteguillo (1999: 153), 'avoid this term, and make subdivisions in their explanations or add comments... to the point of making a clear definition of this section quite difficult'. Likewise, in more than one section, the authors of physics and electrical engineering RAs presented the Methods together with the results pertinent to each section, and discussed each section individually. Thus RA Methods sections contain in addition to the above options, other rhetorical moves such as 'statement of finding, explanation, claim, reference to previous research, recommendations, and stating overall research outcome (summarising)'.

The distinctive but less predictable structure of these sections is perhaps related to the authors' concern of providing an account not only of the experimental methods employed but also of the immediate results obtained by applying each method. Thus, it is unsurprising to encounter such additional moves.

For example, the pure physics RA demonstrates an anomalous structure, as I shall hope to show in the following tables of this RA, sections 2, 3, and 4, presenting the methods employed which immediately follow the Introduction and precede section 5, the Discussion and Conclusion. These sections can be outlined as follows:

Table 5.9 A Sample Move structure analysis of the theoretical physics RA Methods (section 2)

Move	Signals (my emphasis)
Describing experimental procedures	Taking the <i>chiral lagrangian approach</i> [4-13], we systematically parameterize the interactions of the top quark to gauge bosons at low energy using an <i>effective lagrangian with the non-linear realization of the symmetry...</i>
Limiting conditions	The chiral lagrangian \mathcal{L} as defined in Eq. (1), has <i>six independent parameters (the k's) to be constrained by low energy precision data</i> . We will <i>only consider</i> the insertion of k 's once in one-loop diagrams by <i>assuming</i> that these non-standard couplings are small, At one loop level the imaginary parts of the couplings do not contribute in those LEP observables of interest..., <i>hence only the three parameters... can be constrained by LEP data</i> .
Describing experimental procedures	<i>A systematic approach can be implemented for such an analysis based on the scheme used in Refs. [16-18]</i> , where the radiative corrections can be parameterized by 4 independent parameters...
Identifying a procedural problem	<i>Non-renormalizability</i> of the effective lagrangian presents a major issue of how to find a scheme to handle both the divergent and the finite pieces in loop calculations [20,21]. Such a <i>problem</i> arises because one does not know the underlying theory, <i>hence no matching</i> can be performed to extract the correct scheme to be used in the effective lagrangian [22].
Describing experimental procedures	<i>One approach</i> is to associate the divergent piece in loop calculations with a physical cut-off Λ , the upper scale at which the <i>effective lagrangian is valid</i> [9].
Identifying a procedural problem	In the chiral lagrangian approach this cut-off Λ is taken to be...[22]. For the finite piece <i>no</i> completely satisfactory approach is available [20].
Describing experimental procedures	Performing the calculations in the unitary gauge, we <i>calculate</i> the contribution to ϵ_1 and ϵ_2 due to the new interaction terms in the <i>chiral lagrangian (see Eq. (1))...</i>
Statement of result/finding	We find
Describing experimental procedures	Choosing $m_t = 150$ GeV,..., and including both the SM and the new physics contributions, we span the parameter space defined by ...
Statement of result/finding	<i>Within 95% confidence level (CL)</i> , the allowed region of these three parameters <i>was found</i> to form a thin slice in the specified volume.
Referring to supporting data	The two-dimensional projections of this slice are shown in Figs. 1-3.
Statement of result/findings	These non-standard couplings (the k 's) do <i>exhibit some interesting features</i> :
Reference to previous research	<i>In Ref. [23], a similar analysis has been carried out by Peccei et al.</i> However, in their analysis they did not include the charged current contribution.....
Stating over all research outcome (Summarising)	<i>To conclude</i> , assuming b - b - Z vertex is not modified, we found that ... is already constrained at the 95% CL to be $-0.3...$ by LEP data for a 150 (175) GeV top quark.
Recommendation	At the SLC, with <i>expected better measurement</i> of the left-right cross section asymmetry one can <i>further constrain these ks</i> [14].

In the above excerpts from section 2, following the Introduction of the pure physics RA, the authors take the reader in a series of cycles through the procedural steps followed in conducting their research. Table 5. 9 above shows that the authors initiate section 2 by a procedural description move followed by the 'limiting conditions' move under which

the researchers conducted their research. Then they present a series of cycles each of which typically consists of paired tied moves like ‘Describing experimental procedures’ followed by ‘Identifying a procedural problem’. After that, they proceed to present the results and the discussion moves which typically incorporate ‘Statement of finding’, Referring to supporting data’, ‘Reference to previous literature’, followed by ‘Stating research overall outcome (Summarising) and ‘Recommendation’

Table 5.10 A Sample Move structure analysis of the theoretical physics RA Methods (section 3)

Move	Signals (my emphasis)	Cycle
Sign posting	<i>In this section</i> , we study how to constrain the non-standard couplings of the top quark to gauge bosons ...	1
Describing experimental procedures	At the Tevatron and the LHC, heavy top quarks are predominantly produced from the QCD process ... In the former process, In the latter process, these non-standard couplings can be measured by simply counting the production rates of signal events with a single <i>t</i> ...	
Identifying a procedural problem	<i>However</i> , in reality, the momenta of the bottom quark and the charged lepton will be smeared by the detector effects and the <i>most serious problem</i> in this analysis is the identification of the right <i>b</i> to reconstruct <i>t</i> .	
Describing experimental procedures	There are <i>two strategies to improve the efficiency</i> of identifying the right <i>b</i> . One is to demand... Another is to identify... <i>Both of these methods</i> will further reduce the reconstructed signal rate by an order of magnitude.	
Identifying a procedural problem	How will these affect our conclusion on the determination of the non-universal couplings...? <i>This cannot be answered in the absence of detailed</i> Monte Carlo studies.	
Sign posting	<i>Here we propose</i> to probe the couplings ... by measuring the production rate of the single top-quark events.	2
Describing experimental procedures	A single top-quark event <i>can be produced from either the W-gluon fusion process ..., or ...</i> .	
Statement of result/finding	We <i>found</i> that for a 175 GeV top quark ... are well constrained inside the region bounded ...	3
Referring to supporting data	...as <i>shown in Fig. 4</i> .	
Claim (Deduction)	The top quark produced from the <i>W</i> -gluon fusion process is <i>almost one hundred percent</i> left-handed (right-handed) polarized	
Verification	Note that <i>the couplings</i> of light-fermions to <i>W</i> boson <i>have been well tested</i> from the low energy data to the left-handed as described in the SM.)	
Statement of result/finding	A right-handed charged current is <i>absent</i> in a linearly <i>SU(2) L</i> invariant gauge theory with massless bottom quark.	4
Explanation	<i>This means</i> that if we interpret ... as the CKM matrix ..., then ... <i>can be</i> bounded	
Reference to previous research	Recall that if there are more than three generations, within 90% CL,... can be anywhere between 0 and 0.9995 from low energy data [27].	
Recommendation	This measurement can therefore <i>provide useful information</i> on possible additional fermion generations. We expect the LHC can provide similar or better bounds on these non-standard couplings <i>when detail analyses are available</i> .	

As Table 5.10 shows, section 3 consists of four cycles. The first and the second cycles open with ‘sign posting’ moves followed by procedural description moves. Although the first two cycles open with a typical series of moves, the procedural moves included in the first two cycles are of increasing specificity. For example, it is the procedural move in the second cycle that was specifically identified to be used to conduct the research. Similarly, the ‘sign posting’ move in the second cycle is much more specific than that in the first cycle. The first ‘sign posting’ move contains purposive guidelines for the whole section, whereas the latter move includes a more specific guideline pertinent to the rest of the section.

After specifying the procedures to be used in the second cycle, the authors went further to present in the following cycles, which are headed by ‘Statement of finding’ moves, the main findings, and to fit them into the context of the field. As is shown in the outline above, the third move cycle consists of the following series of moves: ‘Statement of finding- Referring to supporting data- Claim (deduction)- Verification’, while the second following move cycle includes the following chain of moves: ‘Statement of finding- Explanation- Reference to previous literature- Recommendation’.

Table 5.11 A Sample Move structure analysis of the theoretical physics RA Methods (section 4)

Move	Signals (my emphasis)
Sampling procedures	The best place to probe ... associated with the t - t - z coupling is <i>at the NLC</i> ...
Describing experimental procedures	A detailed Monte Carlo study on the measurement of these couplings at the NLC including detector effects and initial state radiation can be found in <u>Ref [29]</u> . The <i>bounds were obtained</i> by....
Statement of result/ finding	Assuming a ..., <i>we concluded that within 90% confidence level, it should be possible to measure ... to within about 8% ...</i> .
Explanation	A 1 TeV machine can do better than a 500 Ge V machine in determining... <i>because</i> the relative sizes of the production rates become small and the polarization of the tt pair is purer. ... Furthermore, the top quark is boosted more in a 1 TeV machine thereby allowing a better determination of its polar angle... <i>because</i> it is easier to find the right b
Summarising	Finally, we remark that the NLC, ... can be studied either from the decay of the top quark pair or from the single-top quark production process; ...

The final section, 4, above, has almost no cycling. The first two moves are procedural, whereas the following moves provide statements of findings along with an explanation of these findings. The authors give reasons why TeV machine is better than the others via the use of comparative expressions and adverbs expressing cause such as ‘because’. The last move to close this section is ‘Stating overall research outcome’ (summarising). A close reading of the text brings out the unusual character of this particular RA corpus. The Introduction section of this RA includes 3 research questions, each of which requires an experimental method and a justification for the choice of that particular procedure, which in turn is critical in demonstrating the validity and accuracy of the results obtained. To help the reader know which results are derived from the choice of which particular procedure, the authors attempted to answer each research question by presenting the experimental methods and the results derived, and discussed the findings pertinent to each of these research questions individually in the same separate section. Thus they opted to create three sections, each of which serves a rhetorical purpose, that is answering a particular research question, that makes its presence appropriate. The authors included in each section a procedural description of the experimental method required to answer each specific research question, a justification for that particular choice, the experimental findings derived from the choice of that particular method, and the discussion of the findings pertinent to each research question. Furthermore, they allocated another section titled ‘Discussion and Conclusion’ for the discussion of all the preceding three questions.

5.4.3. Disciplinary Move Structure Variations within RA Methods Sections

In the Methods sections, I have examined the information structure of 16 RA texts selected from different disciplines. As a result of the investigation, I found the functional optional moves 1-8, listed below, included in most of the RAs having a Methods section. However, the moves 9-16 in bold type were encountered in the RAs having anomalous Methods sections. The latter set of moves were adopted by other RA writers to state, locate, explain, verify and relate the findings obtained as a result of applying the procedures described.

The move structure of the Methods sections is indicated in Table 5.12, together with an outline of the list of moves which were most commonly used in this section:

Table 5.12 Move structure of RA Methods sections

RA	Section	Structure (Moves)	No.of Cycle s	No. of Move units
Paediatrics	Methods	2- 1.F- 7- 1- 1.E- 8- 8- 1.F- 8	1	8
Anatomy	Materials & Methods	2- (1.B, 1.A, 1.B)- 2	1	3
Surgery	Patients & Methods	2- 1.A- 11- (1.A, 1.B)	1	4
Nursing	Method	2- 7- 1	1	3
Pharmacy	Materials & Methods	2- (1.B, 1.A, 1.C)	1	2
Zoology	Subjects & Methods	2- 8	1	2
Chemistry	Experimental	4- 1.B- 3- (1.A, 1.B)	1	4
Chemical Eng.	Experimental Section	4- 1.A – 3	1	3
Electrical Engineering	Hardware design Software design	[1- 6- 4- 4- 4- 4- 4- 11- 5.B] [11- 5.A -11] [3- 11- 5.B- 5.A- 5.B- 9.1- 11]	3	21
Physics (Applied)	System Description Simulation Model	[11- 4- (5.A, 5.B)- 11] [6- 11 – 1.3- 3- 10- 13- 2- 9.A]	2	12
Physics (Theoretical)	2- Probing the top quark coupling at LEP 3- At the Tevatron & the LHC 4- At the NLC	[(1.A, 1.B)- 1.C- 1.A- 3- 1.C- 18] [1- 12- 1- 12-11- 9.B- 16- 14] [6- 1- 10- 1- 10] [6- 1.A- 12- 11- 15.B- 9.A] [12- 13- 9.B- 14] [2- 1- 12- 13- 16]	7	39
Maths (Applied)	Method of Solution	[(1.A, 1.C)- 3]	1	2
Maths (Statistics)	No Methods section			
Maths (Algebra)	No Methods section			
Economics	No Methods section			
Law	No Methods section			
History	No Methods section			

1. Describing experimental procedures: This move contains the following components:

- 1.A. Citing procedures
- 1.B. Recounting experimental procedures
- 1.C. Presenting a mathematical treatment
- 1.D. Biological testing
- 1.E. Describing intervention or treatment protocol
- 1.F. Statement of Ethics

- 2. Sampling procedures
- 3. Limiting conditions and constraint assumptions
- 4. Identifying materials and components
- 5. Describing a design or an experimental set-up
 - 5.A. Locating components
 - 5.B. Describing a function or an operation
- 6. Sign-posting
- 7. Describing data collection procedures
- 8. Describing data analysis procedures

9. Verification

9.A. Testing the performance of a system

9.B. Reference to previous research

10. Identifying a procedural problem

11. Referring to supporting data

12. Statement of result/finding

13. Explanation

14. Recommendation

15. Claim

15.A. Hypothetical conclusion

15.B. Deduction

16. Stating overall research outcome (summarising)

The above table demonstrates the move structure of the Methods sections. As explained in the Methodology section of our thesis, the structure 2- 7- 1 of the nursing RA Methods in the above table indicates that the section opened with a ‘Sampling procedures’ move, proceeded to ‘Describing data collection procedures’ and closed with ‘Describing experimental procedures’. Each sequence of numbers within square brackets represents a move cycle, whereas figures within round brackets represent constituent elements of a move.

It is obvious that the RA corpus exhibited cross-disciplinary differences in the use of the Methods sections and in the information structure contained in these sections.

As is indicated in Table 5.12 above, a Methods section does not even exist in the RA of algebra, statistics, history and law. Besides, the study demonstrated marked disciplinary variations in the type, number and order of moves contained in each section. I found that some moves are much more common in certain disciplines than in others, whereas other moves are very rare or do not even exist. For example, ‘Describing experimental procedures’ has a high frequency of occurrence especially in the RAs that include Methods sections, to the extent that this move occurs as quasi-obligatory across disciplines including the Methods sections and reoccurs within the same RA Methods section.

By referring to Swales’ idea of move cyclicity, I found a marked variation in the number of move cycles contained in the Methods sections as well as in the average number of moves included in each section. For instance, the zoology RA contains a two-move Methods section, while the pure physics RA presents Methods in three sections, two of which include more than one move cycle.

Another interesting observation is the order in which the moves are presented. It was found that the move structure patterns do not follow a predictable, strict order. However, medical science RAs demonstrate an obvious preference for the 'Sampling procedures + Describing experimental procedures' move pattern, while other RA authors exhibit a tendency to initiate this section with the 'Describing experimental procedures' move.

From the comparison of the RA Methods sections data culled from various disciplines, it was found that Swales' notion of teaching move structural patterns in a predictable order cannot satisfactorily hold when verified against an RA corpus comprising data elicited from various disciplines, despite the limited number of articles examined. As a result, the move structure analysis poses problems not only for Swales' notion of generic move structure but also confounds another problem for the mandated, prescribed IMRD format. First, some RAs such as electrical engineering and physics showed an elaborate move structure including 'Referring to supporting data, Statement of finding, Explanation, Claim, and Verification'. The appearance of these moves should be reserved to the following Results and Discussion sections. The less predictable move structure is perhaps related to the author's concern for providing an account not only of the methods adopted, but also of giving a justification for the choice of each procedure and the immediate relevant outcome attained as a result of applying each particular procedure. However, this use of Results and Discussion moves can also be explained by the lack of a specific Results section in the pure physics RA; and the absence of a specific Results and Discussion in the electrical engineering RA. The other problem is that algebra, statistics, law and history RAs showed a format different from that promoted by style guide prescriptions of scientific research, (i.e. the (IMRD) format). For maths RAs, they only appear to have Introductions and Results (IR).

Finally, it has to be noted that, unlike the Introduction sections which revealed a higher degree of tendency to conform to the CARS model, RA Methods move structure is not consistent enough to be generalised across disciplines. It might be interesting, in this context, to consider why the Introduction move structure is more consistent than that of the Methods. This is perhaps related to the Introduction's metadiscoursal role. In the RA Introductions, writers attempt to show their awareness of the shared contextual background knowledge (i.e. the related studies). They outline the purpose of the RA and indicate its structure. This section, therefore, does not usually present new information.

In other words, the Introduction contains a ritualistic pattern which is in some sense a version of the world of affairs to be dealt with in the following sections. On the other hand, no sooner had the RA author started to talk about the content, when the metadiscoursal templates encountered in the Introduction section began to disappear in the Methods and the following sections.

Thus it could be argued that the inconsistencies in the Methods move structures is attributed to the variation in the methods through which people approach the real world. In other words, the Methods move structure reflects the way people deal with different contents. Scientific method, for example, requires the IMRD format to be followed. Within this format, there are, according to Swales' claims, certain prototypical structural patterns within each section that make it belong to the RA genre and that should be preserved. But for some RAs, they lack the Methods section, may be, because the epistemological nature of the work to be presented in order to convince the reader of the results is different to that of other RAs such as electrical engineering for whom 'Seeing is believing'.

Let us consider the following case to further illuminate this point. In the third interview, the law RA author was asked about the reason for not including a Methods section in his RA. He argued that they do not have an explicit Methodology section including materials to work with; what they do is just present the problem in the form of an argument followed by counter arguments. Then the author provides exemplar legal cases as evidence in the courtrooms or evidence from the legal system for supporting or refuting the argument. Finally they come up with conclusions. If they do not find in the law a system that accommodates this problem they have to legislate. The author maintained that they do not have established methods to follow; the type of problem attacked determines the procedure they have to follow. In other words, one cannot fit every thing in a certain technique. He added that RA writers usually follow implicit rather than stated procedures.

Thus, the move structural patterns encountered in the Methods section cannot be generalised across disciplines because the structural patterns are peculiar to the authors' purposes which in turn entail different Methods move structures.

However, it might be interesting, for pedagogical purposes, to know the type of communicative options that tend to occur in each discipline, the way these moves are ordered and how far the type of moves and their order vary across disciplines. Such

attempts may pave the grounds for the analysis of another corpus of RA Methods sections in the light of the results obtained from this study.

On the other hand, it becomes quite obvious that the perception of genre analysts (Swales, 1981; Peng, 1987; Holmes, 1997) that this section is very easy to write due to its straightforward structure is not always the case. Furthermore, our analysis indicates that move structure differences in the Methods sections are greater than those encountered in the Introductions, a finding which in turn confirms Swales' (1990: 175-176) suspicion that disciplinary variations of genre lie much more in the Methods sections rather than in the Introduction and Discussion sections.

5.5. Move Structure of RA Results and Discussion Sections

The aim of this section is to examine the Results, Discussion and the integrated Results and Discussion sections of the RA corpus and to consider how far the rhetorical organisation of these sections reveals disciplinary variations or whether they suggest uniformity in the type and number of moves utilised to organise each section. As stated in Chapter Four, these two sections show a degree of overlap (Brett, 1994) between the types of moves included in each section. For example, 'Statement of results' moves found in the Results sections also reoccur in the Results and Discussion, and the Discussion sections.

The analysis of these sections was based on the model outlined by Dudley-Evans (1994: 225), and Swales' (1990) list of moves, which he adapted from Hopkins and Dudley-Evans' (1988: 118) model for natural science Discussion sections. However, I made a few minor modifications as is indicated in our analysis presented below. The above-mentioned authors reported a cyclical patterning of moves, each of which is headed by one obligatory move, 'Statement of Result'. The moves promoted to occur in each move cycle of the Results and Discussion section were briefly introduced and discussed earlier in Chapter Three of the present thesis.

Genre analysis in this section begins with the move structure of the RA Results sections. Next, I present a description of the list of moves identified in the Discussion sections. Then the move structure of the integrated Results and Discussion sections is investigated. I concomitantly demonstrate some features that do not appear in Hopkins and Dudley-Evans (1988), and Dudley-Evans' (1994) models. Finally, I present Results and Discussion move structure variations across disciplines.

5.5.1. Move Structure of RA Results Sections

The Results, and Discussion sections in the present corpus displayed variations of headings. About half of the RA writers in the present corpus presented their results in a separate section, labelled 'Results' in the majority of articles, or had the heading 'Solutions', which was the case in applied maths, or titled by the heading of the topic to be investigated, like the statistics RA. However, other RA writers coalesce the moves of this section and those of the Discussion in an integrated section labelled 'Results and Discussion', the structure of which will be discussed later.

This section puts forward a description of the communicative moves found in the Results sections of the RAs, and the linguistic exponents associated with the moves. Taking Dudley-Evans' list of moves as a reference, I will begin with the moves identified by him that tend to occur in the RAs containing separate sections for the Results. Then I will present the moves that occurred in the corpus and that have not appeared in his model. The list below shows the moves encountered in the RAs containing separate Results sections in the present corpus; the moves written in bold did not appear in Dudley-Evans' model.

1. Statement of result/finding
2. Referring to supporting data
3. Explanation
4. (Un)expected outcome
5. Claim (deduction)
6. Exemplification
7. Evaluation of method (See Dudley-Evans 1986)
- 8. Describing experimental procedures**
- 9. Describing data analysis procedure**
- 10. Introducing a theoretical proposition**
 - 10.1. a lemma**
 - 10.2. a theorem**
 - 10.3. a corollary**
- 11. presenting a proof/solution**

The table below shows the results of the analysis of the move structure of the Results sections.

Table 5.13 Move structure of RA Results sections

RA	Section	Structure (Moves)	No. of Cycles	No. of Move units
Paediatrics	Results	[2- 1] [2- 1][2- 4- 6- 1- 4- 6] [1- 2- 6- 1] [1- 2- 3- 1]	5	18
Anatomy	Results	[1- 2][4- 1- 2- 9- 1][1- 2][1- 2][1-2]	5	13
Surgery	Results	[7- 1- 3- 1]	1	4
Nursing	Results	[1-6] [1- 2- 6]	2	5
Zoology	Results	[1- 2- 1- 2- 1- 2]	1	6
Chemical Eng.	Results	[2- 8- 1-3- 5- 2]	1	6
Maths (Applied)	Solutions	[11- 11- 11- 11- 2- 1- 2- 5] [1- 2- 5]	2	11
Maths (Statistics)	(Extinction Time)	[10.1- 11- 1] [10.2- 11- 1] [10.3- 11- 1] [10.2- 11- 1]	4	12
Maths (Algebra)	Results	[10.1- 11- 1] [10.1- 11- 1] [10.1- 11- 1] [10.2- 11- 1] [10.2- 11- 1] [10.2- 11- 1]	6	18

5.5.1.1. Moves Identified as Appearing in Dudley-Evans' Model

In this segment, I will start with the moves proposed by Dudley-Evans that tend to occur in our RA corpus. *I have made a few minor adaptations. The linguistic exponents* that tend to signal these moves are underlined. Illustrative examples from the analysed data are also provided.

5.5.1.1.1. Statement of result/ finding

Since 'Statement of result' and 'Statement of finding' moves might be used interchangeably, according to Dudley-Evans' (1994) definition, I opted to use 'Statement of result/ finding' move to stand for the constituent elements of both moves, except for 'reference to graphs and tables' included in Dudley-Evans' 'Statement of result' move. The latter constituent element, 'reference to graphs and tables', was renamed 'Referring to supporting data' move. In addition to the constituent options mentioned by Dudley-Evans, RA writers tend to extract meaning from the non-verbal data, or the actual figures by including the following options that are frequently associated with the above-mentioned move:

A) Describing a finding: RA writers give a detailed account of a finding, saying what it looks like, or pinpointing its particular qualities.

B) Classifying findings: RA authors divide findings into categories, or parts having similar characteristics; each part is sometimes given a name.

Illustrative examples of the constituent options of this move are the following:

e.g.1. Analysis of many well-impregnated neurons from adult human brains revealed the existence of four neuronal cell types within the AHA and SON. These neuronal cell types were consistently observed in both the male and female hypothalami and **categorized** according to [1] cell body size and shape; [2] density of dendritic trees; and [3] density of dendritic spines. Using these criteria, the well-impregnated neurons were **classified** into four types (Table 1). (RA 2)

e.g.2. Large numbers of well-impregnated neurons of this type were found in the AHA, They had a moderate number of fine spines. (RA 2)

The above underlined lexical items *revealed the existence*, *consistently observed*, and *found* anticipate what follows as a finding. The lexical items such as *categorized* and *classified* followed by a list of numbers, as is shown in the first example above, are signals of classification of findings. In example 2, we may note that the verb *had* indicates the meaning of ‘possession’. It anticipates what follows as a description of the characteristics possessed by the agent.

5.5.1.1.2. Referring to supporting data

This move has a metatextual function; that is referring to the visuals and non-verbal data to be presented and commented on by the succeeding moves. Writers use visuals (tables, graphs, designs, or charts) containing a compact form of data to convey a clear sense of the results. Thus, authors frequently make use of this move to refer to the visuals to be described or the location of the findings to be commented on. However, reference to visuals, as pointed out in the above move, is dealt with as a component of the ‘Statement of result’ move in Dudley-Evans’ model. The above move is commonly signalled lexically by the use of lexemes, such as *figure*, *table*, *type*, or *curve*. According to the RA sample texts, the aforementioned lexemes are associated principally with verbs presenting results, such as *show*, *illustrate*, *give*, *present*, *represent*, *indicate*, and *compare* as is shown in the following examples:

e.g.1. This is illustrated in figure 1, which shows all of the data given in Table 1. (RA 8)

e.g.2. Blood indexes at baseline in both groups are presented in Table II.... Table I shows the baseline characteristics of both groups. (RA 1)

5.5.1.1.3. Explanation

In this move, the writer provides explanation or justification for the behaviour of the extracted findings. Signals indicating this move include modal auxiliaries plus lexical items expressing reason such as *responsible for*. For example:

e.g.1. A low power of the study because of the small number of patients may be responsible for this finding. (RA 1)

However, the other two examples did not include explicit signals, as is shown in the following two examples:

e.g.2. Three patients developed wound infection; two had been given Ampiclox before operation, and one of these two patients had mucosal perforation. (RA 3)

e.g.3. The standard deviations between individual experimental runs indicate that the error is between 1 and 7%, while a more realistic estimate of the average maximum experimental error is approximately 10%. The estimated experimental error is dominated by the errors of the volumetric rate of absorption and Henry's law constant. (RA 8)

In the absence of explicit signals of explanation, therefore, the second clause of 'e.g.2', and the second sentence of 'e.g.3', above, will be read as providing explanation of the findings stated in the antecedent clause and the antecedent sentence respectively. The second clause of the second example provides reasons why the three patients developed wound infection. Similarly, the second sentence of 'e.g.3' states that the estimated experimental error is due to the error of the volumetric rate of absorption and Henry's law constant. To confirm the present analysis, the RA writers of these articles included these instances were asked to identify their purpose. The RA writers' view further supports our analysis concerning the function of these instances.

5.5.1.1.4. (Un)expected outcome

This move presents information including whether the results reported in the study are significant or as expected. Examples:

e.g.1. These neurons were the most numerous and displayed ovoid, ... (RA 2)

e.g.2. As expected, changes in blood indexes were also significantly related to the study group. (RA 1)

e.g.3. With the use of the first classification of the outcome, being in the treatment group was strongly and significantly related to response ($p < 0.01$). (RA 1)

The first example is extracted from an RA whose author pointed out that this move highlights a significant outcome because these types of neurons represent 90% of the total number.

5.5.1.1.5. Exemplification

The RA authors give numerical exemplar data to further substantiate a finding or an outcome. ‘Exemplification’ instances are written in bold type below. Each move instance is meant to support the immediate preceding ‘Findings’ move as is shown in the following examples:

e.g.1. There were no significant differences in scores on the six FIRO-B measures between the diploma and baccalaureate students. **The two groups’ mean scores on the measures were all in the medium range, from a low of 3.23 to a high of 4.26,...**(RA 4)

e.g.2. With the use of the first classification of the outcome (...), being in the treatment group was strongly and significantly related to response ($p<0.01$). **Complete response occurred in more than half of the subjects in the treatment group but in none of the placebo group. Partial response occurred in 36.46% of the treatment group, compared with 5.9% in the placebo group.** (RA1)

5.5.1.1.6. Claim

In this move, according to Dudley-Evans’ model, the writer draws either a hypothetical, or a definite conclusion. The first instance of the following is signalled by the modal ‘may’, whereas in the second example, the RA writer attempts to draw a definite conclusion. Signals of the latter are the linking word ‘therefore’ and the modal auxiliary ‘will’. However, the writer of the chemical engineering RA, from which the first instance is culled, maintained that this sentence is meant to convey a deduction rather than a hypothetical conclusion. He added that the modal auxiliary ‘may’ is used only to mitigate the conclusion stated.

e.g.1. It may be seen that the diffusivity of N₂O in these aqueous solutions of 50 mass % total amine is relatively insensitive to the mass ratio of DEA to MDEA. (RA 8)

e.g. 2. Therefore, the energy of excitation at $x = 0$ is equal to the sum of energies of interacting modes at any location along the x axis. The energy will be exchanged between the two modes; and this exchange may be utilized in the design of mode couplers operating with the resonance condition ...(RA 12)

5.5.1.1.7. Evaluation of method

(See Dudley-Evans (1986:143))

e.g. The access was not difficult when compared with the right upper transverse hypochondrial incision which we had performed previously. (RA 3)

In this move, the authors draw a comparison between the present access and that performed in previous operations, with an implied recommendation for other peers to

use this method in the future. Evaluation of the method used is also documented in Dudley-Evans (ibid.).

5.5.1.2. Moves Documented as not Appearing in Dudley-Evans' Model

Analysis of the Results sections indicated that RA writers of maths in the present corpus employed generic text structures and type of moves that do not appear in Dudley-Evans' model. Besides, the chemical engineering RA writer included procedural moves that are supposed to appear in the Methods sections. According to Dudley-Evans' model of the Discussion sections, authors are not supposed to talk about procedural description in the Results and Discussion section. They are expected to reserve their description of procedural issues for the Methods sections only. What I found in the RA Results sections examined, however, are other less common procedural moves. They are 'Data analysis procedures' moves with only one instance of each as is shown in the skeletal examples below.

5.5.1.2.1. Describing experimental procedures

e.g. The temperatures were controlled and measured to within $\pm 0.1^{\circ}\text{C}$. (RA 8)

5.5.1.2.2. Describing data analysis procedure

e.g. Since type I neurons were all well-impregnated in large number in the AHA, they could be analysed quantitatively. The parameters included: [1] number of dendritic stems..., [2] number of branching points,.. [3].., [4].., and [5] mean diameters of first, second, and third order dendrites. (RA 2)

On the other hand, the Results sections of maths create rather more of a problem for the Model proposed by Dudley-Evans. They have an anomalous move structure, very different from that of the other structural patterns assigned to the RA Results sections of other disciplines. A careful analysis of the Results sections of algebra and statistics RAs, conducted with the help of the same RA writers, showed that the following move structure is used:

1. Introducing a theoretical proposition (a lemma, a theorem, a corollary)
2. Presenting a proof/solution
 - 2A) Limiting assumptions
 - 2B) Preliminary hypothetical results
3. Statement of result/finding

5.5.1.2.3. Introducing a theoretical proposition

This move is generally a brief mathematical statement, which can usually be proved by logical reasoning. This move is a rather large category. Typical realisation options of this move include a *theorem*, a *lemma*, and a *corollary*. According to Higham (1993:12) ‘A *theorem* is a major result that is of independent interest’. ‘A *lemma* is an auxiliary result- a stepping stone towards a theorem’. In other words, it is a short helping theorem introduced in the steps of proving a theorem. ‘A *corollary* is a direct or easy consequence of a lemma, theorem, or proposition’ (ibid).

In this move, the writer generally states very briefly the desired results and the limiting assumptions that constrain the validity of these results. Illustrative examples are presented in the skeletal text in Table 5.14 bellow.

5.5.1.2.4. Presenting a proof/solution

This move is an outline of the logical reasoning structure of the key ideas, steps or principals employed by the writer to obtain the desired results. A proof is often carried out in consecutive steps including:

A) Assumptions signalled by lexical items such as ‘let’, ‘if’, ‘if and only if’, ‘suppose’, and

B) Hypothetical results (i.e. consequences of the limiting conditions and assumptions) indicated by results conjuncts like ‘then’ or ‘therefore’.

e.g.1. **proof.** Let Then

Thus if B is a BOL algebra, then we have...(RA 14)

This example indicates that the statement after ‘if’ is an assumption and what comes after ‘then’ is a result that needs to be proven.

Authors may develop the steps or the structure of a proof by providing background equations, which are already known to peer researchers, to be used in the proof of the desired result.

e.g.2. Then $q(x)$ will satisfy the “background equation”. (RA 13)

Besides, they tend to provide a mathematical rephrasing of the equation and a solution of these background equations.

e.g. 3. ‘By solving the “Background equations” in (2.1)....’ (RA 13)

5.5.1.2.5. Statement of result/finding

We noticed that the ‘Statement of result’ usually appears as a cycle opener move in Durley-Evan’s model. However, in the maths RAs it is used as the closing move in a move cycle. Authors state a particular desired result arising from the logical structuring steps of the ‘Presenting a Proof’ move. The present move includes a restatement of the theoretical proposition (the theorem, the lemma, or a corollary), which in turn contains the desired result, and is often followed by the closing clause ‘This completes the proof’ to signal proof completion.

In the structure of the maths Results sections, all the above three moves are more or less obligatory, and there is also some degree of consistency in the positioning of these moves. Furthermore, a considerable amount of recycling of this structural pattern was found in each Results section. However, these sections may vary in the amount of detailed information included, and in the choice of sub-moves, particularly the steps of move 2, ‘Presenting a proof’.

The three-move structural pattern description occurs in the statistics and algebra RA Results sections.

We shall now look at the moves of a text example of a maths RA Results section, in Table 5.14 below, in greater detail to see how the algebra RA writer organises his Results sections.

Table 5.14 A Sample Move structure analysis of algebra Results section

Move	Signals (my emphasis)	Cycle
Introducing a theoretical proposition (a lemma)	Lemma 1. For a BOL algebra B over a field F , $(x, y, z) x + (y, z, x)y - (yz, x, y) - (xy, z, x) = 0$, where $x, y, z \in B$.	One
Presenting a proof 1. Limiting conditions 2. (Hypothetical result)	Proof. Let $f(x, y, z) = (x, y, z)x + (y, z, x)y - (yz, x, y) - (xy, z, x)$. Then $f(x, y, z) = (xy \cdot z - x \cdot yz)x + (yz \cdot x - y \cdot zx)y \dots$	
Statement of result	Thus if B is a BOL algebra, then we have $f(x, y, z) = xyz \cdot x - (x \cdot yz)x + yzx \cdot y - (y \cdot zx)y$ $- yzx \cdot y + (y \cdot zx) y - xyz \cdot x + (x \cdot yz)x = 0$.	
Introducing a theoretical proposition (a lemma)	Lemma 2. Let B be an algebra over a field F . Then B is BOL algebra if and only if for x, y, z , in B , $f(x, y, z) = (x, y, z)x - (xy, z, x) = 0$.	Two
Presenting a proof	Proof. Since $f(x, y, z) = (xy \cdot z)x - (x \cdot yz)x - xyz \cdot x + xy \cdot zx$ $= \dots$ $= (x \cdot yz)x - x(yz \cdot x)$,	
Statement of result	$f(x, y, z) = 0$ if and only if B is a BOL algebra.	Three
Introducing a theoretical proposition (a lemma)	Lemma 3. An algebra B over the field F is a BOL algebra if and only if $(x, y, z)x = (xy, z, y) + (xy, z, x) - (x \cdot yz, y)$.	
Presenting proof 1. Limiting conditions 2. Hypothetical result	Proof. Let $f(x, y, z) = (xy, z, x) - (x \cdot yz, y)$. Then $f(x, y, z) = xyz \cdot y - xy \cdot zy - xyz \cdot y + x \cdot yzy$ $= x(y \cdot zy) - (x \cdot yz)y$.	
Statement of result	Since B is a BOL algebra if and only if $f(x, y, z) = 0$, Lemma 3, follows from Lemma 2.	Four
Introducing a theoretical proposition (a theorem)	Theorem 1 [1]. In a BOL algebra B , the following are true:	
Introducing a proof	Proof. We provide a different proof from that in [1]. We have	
Statement of result Proof completion	Using (I) on the right hand side of (ii), we obtain This completes the proof.	Five
Introducing a Theoretical proposition (a theorem)	Theorem 2.	
Introducing a Theoretical proposition (a theorem)	Theorem 3. Let B be a BOL algebra. Then $R_{[z[x,y]]}$ is derivation of B if and only if x and y commute.	Six
Introducing a proof 1. Limiting conditions 2. Hypothetical result	Proof. Suppose that Then $w[z, xy - yx] - [z, xy - yx]w = w[z, xy - yx]$.	
Statement of result	Therefore $[zxy \cdot w - zyx \cdot w - xyz \cdot w + yxz \cdot w] = 0$ if and only if $xy = yx$. This completes the proof.	

The above table demonstrates that the math RA Results section consists of a typical cyclical pattern of moves. Each cycle opens with the Introducing a theoretical

proposition (lemma, theorem, or corollary) move which frequently includes a rather concise statement of the desired results and the limiting assumptions that should be fulfilled to obtain these results. This move appears as mandatory in that each move cycle is headed by this particular move. As is shown in the above table, the author generally initiates the move cycle by a conditional clause, stating a desired proposition or result, the fulfilment or non-fulfilment of which is left unresolved, and an open condition. However, an open condition conveys the expectation that the condition will be fulfilled. The desired result is expressed in the main clause, whereas the open condition to be fulfilled is stated in the subordinate clause. The limiting condition is indicated by *where*. Chiefly subordinators, such as *where*, *if and only if*, *let*, and *suppose*, introduce finite adverbial clauses of condition.

Having introduced the lemma in the first move cycle of the above table, the author goes to the next move, 'Presenting a proof', which is usually given in consecutive logical steps based on reasoning. It includes:

- A) Assumptions indicated by the lexical items 'let' or 'if', 'suppose', and
- B) Results or consequences of the assumptions indicated by 'then' and 'therefore'.

e.g.1. **proof.** Let Then

e.g. 2. Thus if *B* is a BOL algebra, then we have..... .

The hypothetical assumption is indicated either by a conditional clause initiated by the subordinators *if*, or, *if and only if*, or in clauses introduced by the imperative verb *suppose*, or by preposing the verb *let* followed by 3rd person subjects.

The first part of each of the above examples indicates an attempt to introduce the limiting assumptions expressed by 'let' or the subordinator 'if', whereas the second part presents the desired result. In other words, the statement after 'if', 'if and only if', 'suppose' or 'let' is always an assumption and what comes after 'then' is generally a desired result which needs to be proven. Because of the legitimate syntactic possibility of reversing the two parts of the conditional sentence we end up with legitimate ordering of the parts of the move. Thus, there seems to be no problem in the order of the two parts of the move. For example,

An algebra B over the field F is a BOL algebra if and only if

$(x, y, z)x = (xy, z, y) + (xy, z, y) - (x \cdot yz, y).$

However, initiating a move with a conditional subordinate clause followed by the main clause introducing the desired results seems to be more commonly used than the reversed version.

When the limiting conditions or assumptions are indicated by 'if and only if' which is sometimes denoted by 'iff', such a construction means that the statement works in two directions. Conversely, if the statement before this construction is considered as an assumption then the statement after it will be the result. And if the statement after this construction is considered as an assumption then the statement before it will be considered as a result.

Finally, the author closes each move cycle with the 'Statement of result' move which contains the end result. It is signalled by a result adjunct such as *therefore*, *thus*, or *then* to introduce a text expressing a consequence or a result of what has been proven or said so far. Other apparent means whereby this move may be signalled lexically are:

- 1- Lexical signals indicating what follows as a result, such as 'obtain', and 'get',
- 2- Restatement of the desired result which has already been presented in Move 1. We notice here that the 'Statement of result' move is directly related to Move 1 on which the author based his/her proof to get the end result.
- 3- The signalling clause 'this completes the proof' refers anaphorically to proof completion. It is worth mentioning that the third means tends to close a proof of a theorem rather than a lemma.

The above analysis indicates a considerable departure in maths numerical RAs from other prototypes. One might therefore be tempted to use this analysis in order to establish the features of the prototype mathematical genre. Nevertheless, as with some of the other deviant forms analysed, e.g. history, the very limited nature of the corpus analysed makes it clear that any attempt to establish alternative forms remains one for further research and no such result should be construed from this study.

5.5.2. Move Structure of RA Discussion Sections

The RA texts selected for this study revealed that only 8 RA writers introduced the discussion of their results in a separate section. Chemical engineering, statistics and algebra RA writers closed their articles with the Results sections. The Discussion section displayed three variations of headings: 'Discussion', 'Discussion and Conclusion', and 'Conclusion'.

Taking Dudley-Evan's model as a reference, I investigated the move structure of the Discussion sections. List 3 below shows the different moves used in the 8 Discussion sections of the sample RA texts.

The move structures, order, and move cycles of the Discussion sections are displayed in Table 5.15 below.

Table 5.15 Move Structure of RA Discussion sections

RA	Section	Structure (Moves)	No. of Cycles	No. of Move units
Pediatrics	Discussion	[6- 4- 7- 5- 4- 5] [6-5- 9- 10.1-8]	2	11
Anatomy	Discussion	[1- 4] [1- 7- 5- 4- 5] [1- 6- 5- 10.1- 8]	3	12
Surgery	Discussion	[4- 5- 2- 7]	1	4
Nursing	Discussion	[1- 4- 5- 7] [1- 5- 4- 7- 8] [1- 4- 5- 8] [1- 5- 7- 4] [5- 4- 7]	6	22
	Sum. & Recom.	[10.2- 8]		
Zoology	Discussion	[2- 1- 4] [1- 4- 5- 4- 5- 4- 2- 7- 8]	2	12
Physics (Theoretical)	Discussion and Conclusion	[7- 3- 1- 5- 7- 10.1] [10.2]	2	7
Maths (Applied)	Conclusions	[10.1- 10.2- 8]	1	2
Electrical Eng.	Conclusion	[10.1- 8]	1	2

- 1- Statement of result/finding
- 2- Information move
- 3- Exemplification (See Hopkins and Dudley-Evans (1988:118))
- 4- Reference to previous research
- 5- Explanation
- 6- (Un)expected outcome
- 7- Claim (Hypothetical conclusion or Deduction)
- 8- Recommendation
- 9- Limitation
- 10- Stating overall research outcome
 - 10.1 Highlighting the achievement of the research objective
 - 10.2 Summarising

In what follows, I will present each move from the above list in detail. Each move is supplemented by illustrative exemplification together with the linguistic components that tend to signal the occurrence of this move.

5.5.2.1. Information move

The *Information move*, according to Dudley-Evans (1994: 225) includes information about 'theory, aim of the research, the methodology used, previous research that is felt

to be necessary for the understanding of what follows in the move cycle'. Accordingly, I assigned *Information move* to the first example below, which is the opener paragraph of the zoology RA Discussion section.

However, the *Information move* is felt to be over-generalised as it includes constituent elements each of which should be dealt with a separate move. For example, the 'methodology used' should appear as a separate move. Similarly, 'previous research' is anticipated to be included in the *Reference to previous research* move, for the sake of consistency, rather than to be contained as a constituent element of the *Information move*.

However, a genre analyst may assign various interpretations to the first example below. According to the CARS model, the first sentence of the first instance below is considered as '*Indicating a gap*' step rather than an *Information move*. That is because this sentence is initiated with an adversative conjunction '*Despite*' and included a lexical negation signalling a gap. Likewise, the rest of the first instance indicates a *Reference to previous research* move, according to Dudley-Evans' model of Move-analysis to other parts of the RA text. Again, these different interpretations reinforce the previously mentioned idea concerning the unavoidable degree of subjectivity on the part of the genre analyst that might affect the validity of text analysis.

On the other hand, the second instance below may be thought of as a better example of an '*Information move*' than the first because it basically provides background information about the practices of the villagers which pave the ground for the author to deduce that these habits support his findings. Examples:

e.g.1. Despite the improvement in medical services witnessed in Jordan in the last few decades, hydatid disease is still endemic, causing morbidity and occasional mortality. Two of the 34 children with cysts who were operated on at JUH and described by **El-Muhtaseb and Shihabi (1986)** died. Complications of hydatid disease included pleural effusion, broncho- pleural fistula, haemothorax, jaundice and anaphylactic shock (**Sliman, 1976; Kalani and Broadhead, 1981**). (RA 6)

e.g.2. The practice of eating raw, unwashed wild plants (e.g. *Malva* sp.), potentially contaminated with the faces of infected dogs, is quite common among villagers, particularly during spring. Additionally, many locals report geophagia in children and pregnant women and, as seen in the present study, human-dog contact is common. (RA 6)

e.g.3. Recently,..., it was learned that Bianchi has attempted to minimize the incidence of wound disruption, changing his technique by opening the fascial layer in the same way

as the skin. For the past 3 years he has had no wound disruption. His full report is awaited with great interest. (RA 3)

5.5.2.2. Statement of result/finding

There are nine instances of this move in the corpus. With the exception of two cases, a move cycle usually opens with this particular move. As is indicated in the following examples, verbs such as ‘find’, show, and ‘demonstrate’ are predominant signals of this move.

e.g.1. We found no significant differences in the self-reported interpersonal behaviors... (RA 4)

e.g.2. The third- and fourth-year nursing students in this study showed a higher desire for contact with people... (RA 4)

e.g.3. The present study, however, demonstrated additional morphological features of type I neurons, (RA 2)

5.5.2.3. Exemplification

‘A writer gives an example to support his or her explanation’ (Hopkins and Dudley-Evans 1988: 118).

Only one instance was encountered in the separate Discussion section of the present corpus. It was used to further support the writer’s hypothetical deduction introduced in a previous move.

e.g. To illustrate how a specific symmetry breaking mechanism might affect these couplings ... , we consider the SM with a heavy Higgs boson as the full theory, and perform matching between the underlying theory (SM) and the effective lagrangian. (RA 11)

5.5.2.4. Reference to previous research

This is the most frequent move in the Discussion section. It contains two types of information:

A) Reference to previous research (for support or agreement)

This constituent element is signalled by the use of explicit lexical items showing support or an agreement between the present outcome and the past related research. Such lexical signals include ‘similar to’, ‘close to’, ‘consistent with’, and ‘likewise’. The lexical signals are underlined and the references cited are indicated in bold type below.

e.g.1. Type II neurons were similar to those described previously in the non-human SON [1, 2, 6, 7, 16]. (RA 2)

e.g.2. This is close to the rate reported from Iraq by **Shawket and Al-Waidh (1974)**, who reported 57 cases of the renal... (RA 6)

e.g.3., a finding consistent with a number of previous reports from uncontrolled studies. 8,9 (RA 1)

e.g.4. This is consistent with **Snavelly and Fairhurst's (1984)** findings.... (RA 4)

e.g.5. This potential for improved scores.... was likewise found by **Sellick (1991)**... (RA 4)

e.g.6. Our high rate of wound infection... is still within that reported in the literature...5. (RA 3)

B) Reference to previous research (for disagreement)

e.g.1. However **Goldsmith et al. (1991)** found the lungs were the organ most often infected...among 224 Arab and Druze patients, followed by the liver. (RA 6)

e.g.2. In contrast, **Iwasiw and Olson (1985)** found that baccalaureate graduates tended to be more empathetic than diploma-prepared nurses. (RA 4)

In the above examples, signals of this constituent step are adversative linking adjuncts such as 'however', or explicit preparatory expressions like 'in contrast'.

5.5.2.5. Explanation

This move is generally expressed by:

A) modal expressions such as 'perhaps', 'possible', or 'probably', together with an explicit lexeme indicating an explanation;

e.g.1 Perhaps this practice explains the relatively high infection rates among females (housewives) and young males. (RA 6)

e.g.2. One interpretation of our Jordanian students' scores on the FIRO-B could be related to religion. (RA 4)

e.g.3. These neurons were not described earlier in the SON... probably due to the selective properties of the different variants of the Golgi technique used in these earlier studies. (RA 2)

B) modal auxiliaries like 'could', or 'may', followed by an explicit lexeme indicating explanation;

e.g.1. Their very small size, which makes it difficult to distinguish them from the glial cells may account for the lack of their identification. (RA 2)

e.g.2. However..., it may be related to the fact that iron is important for catecholamine metabolism ... (RA 1)

C) explicit preparatory lexical items indicating explanation such as ‘explain’, ‘due to’, ‘lead to’, ‘attributed to’, ‘related to’, ‘the result of’, or ‘account for’;

e.g.1. Correction of iron deficiency may lead to restoration of the function of these neurotransmitters, offering an explanation for the abatement of BHS during iron therapy. (RA 1)

e.g.2. Note that due to the Ward identities associated with the photon field there can be no non-universal contribution to either the $b\text{-}b\text{-}A$ or $t\text{-}t\text{-}A$ vertex ... (RA 11)

e.g.3. The authors related their findings to the effect of the nurturing and helping nature of nursing on the socialization of new members. (RA 4)

D) causative conjuncts such as ‘because’;

e.g.1. Because social status is a component of ..., male may exert more control ... (RA 4)

e.g.2. It should be noted, however, that iron deficiency is unlikely to be the only factor responsible for BHS, because not all children with BHS were iron deficient at baseline, ... (RA 1)

5.5.2.6. (Un)expected outcome

This move contains information, which indicates whether a finding is expected, or not in conformity with expected ones. In other words, it indicates whether a result is within the norms, or inconsistent, or more frequent than the other findings either in the present study or the findings in the previous related studies. Illustrative examples are as follows:

e.g.1. Our results showed a drastic response to iron therapy compared with response to placebo, ... (RA 1)

e.g.2. An interesting finding of the present study was the occurrence of very small neurons (type IV) in the human SON. (RA 2)

e.g.3. It should be noted, however, that iron deficiency is unlikely to be the only factor responsible for BHS, because not all children with BHS were iron deficient at baseline... (RA 1)

As is shown in the first two examples above, the authors indicated the significance of the outcome by the use of qualifying adjectives such as, ‘drastic’ and ‘interesting’. In the first example, it was a drastic finding in comparison to other findings in the study.

When I asked the RA writer why the finding in the second example is interesting, he maintained that this outcome is significant because these neurons have not been identified and described in previous studies. On the other hand, the non-consistent finding in the third instance is signalled by the lexical item *unlikely*. This move indicates that this observation or factor does not account for all the cases in the present study. The ‘explanation move’ introduced by ‘because’ in the subordinate clause appears to be tied to the above move as it comments on the significance or non-conformity of the findings.

5.5.2.7. Claim

As mentioned earlier, this move represents an attempt to draw either a definite, unhedged claim or a hypothetical conclusion from the reported results. Thus this move, according to Dudley-Evans (1994), is made up of two constituent options: i) Hypothetical conclusion, and ii) Deduction.

Here are some typical examples culled from the RAs’ separate Discussion sections:

A) Hypothetical conclusion

The authors presented hedged claims that arise from their findings. Some of the signals indicating such options are the underlined modals and/or modal expressions in the examples listed below:

e.g.1. Our data suggest that iron may be critical in the treatment of BHS and that iron deficiency may be the main underlying defect in BHS. (RA 1)

e.g.2. These side-branches have not been demonstrated previously, which suggests the possibility of a species difference between type I neurons of the human and non-human hypothalamus. (RA 2)

e.g.3. Such a close working relationship may influence the behavior of both sets of students. (RA 4)

e.g.4. Although females currently hold the majority of nursing management positions in Jordan, this may change in the future. It may also suggest ... (RA 4)

e.g.5. This increased understanding of the helping role should enable greater rapport with patients, ... Thus, during the course of their program, students should identify patients’ specific needs with increasing effectiveness. (RA 4)

e.g.6. Furthermore, the finding of low Wanted Control scores may indicate that students need to influence and direct encounters with others. (RA 4)

B) Deduction

In this step, the writer, according to Hopkins and Dudley-Evans (1988:118) presents a more confident claim about the generalisability of his results.

e.g.1. Different symmetry breaking scenarios will imply different correlations among the couplings of the top quark to gauge bosons. (RA 11)

e.g.2. From this example we learn that the effective non-standard couplings of the top quark to gauge bosons arising from a heavy Higgs boson. are correlated in a specific way, ... Hence, if the couplings of a heavy top quark to gauge bosons are measured and exhibit large deviations from these relations, then it is likely that the electroweak symmetry breaking is not due to the standard Higgs... (RA 11)

According to the RA writer's view, in the first instance above, he has drawn a general claim based on a general theoretical argument. This is expressed through modal auxiliaries like 'will'. The second example text opens with a deduction based on a previous example referred to anaphorically by the underlined items. This is followed by another sentence presenting a deduction initiated by a result conjunct, 'hence'; and closed with a clause initiated by the inferential conjunct, 'then'. Thus, this inference is based on what is presented in the preceding sentences. It is apparent that these examples do not contain hedging particles to mitigate the claim, as it is the case in the 'Hypothetical conclusion'.

5.5.2.8. Recommendation

In this move, the writer may indicate a need for further research, suggest future research questions that can be investigated, and/or may refer to the significance and the practical applications of the reported findings for peers in the field. Instances of this move usually occur at the end of a move cycle of a Discussion section or typically at the end of the RA.

A) Indicating a need for further research

This constituent option is usually signalled by the use of explicit lexemes similar to the underlined ones in the following examples. The simple present verb tense and modal auxiliaries, like *may* as well as lexical verbs such as 'need', 'remain', 'deserve', 'recommend' and 'help' are common signals used to propose a need for further research. Examples:

e.g.1. Further investigation into these factors is needed if the disease is to be controlled effectively. (RA 6)

e.g.2. The issue of male/female influence in nursing is an important and sensitive topic that deserves further study. (RA 4)

e.g.3. It remains to be seen whether further studies reveal differences in interpersonal behavior among male nursing students and between male nursing students and male students in other health professions. (RA 4)

e.g.4. Further studies are needed to elucidate the precise mechanism of action of iron in the treatment of BHS. (RA 1)

e.g.5. On the basis of these findings, we recommend that research be conducted on the interpersonal behaviors of faculty members,... Such research may help explain the present results. A further study may identify possible differences between female and male nurses ... (RA 4)

B) Indicating significance or practical applications

On the basis of the significant findings reported, a writer may indicate practical applications of these findings.

This particular step may be thought of as an echo of the ‘Stating research value’ move encountered in the Introductions where the writer highlights the hypothetical implications or values of the research to be presented. However, the practical applications of the present step are based on the actual results obtained and discussed. I noticed that the nursing and anatomy RA authors who stated the value of research in the Introduction did also include the above step in the RA separate Discussion sections, as is shown in the following table below:

Table 5.16 Relation between Stating research value and Recommendation moves

RA	Introduction (Stating research Value)	Discussion (Recommendation)
Nursing	Research on the interpersonal orientation... <u>will provide</u> a basis for the planning of nursing program ...	The findings from such a study <u>would facilitate</u> the planning of strategies... (RA 4)
Anatomy	This study <u>may serve</u> as a basis for further morphological studies related to ageing....	These results <u>may serve</u> as a basis for <u>further morphological studies</u> related to ageing and specific diseases... (RA 2)

‘Indicating significance or practical applications’ may be signalled lexically by lexemes such as ‘facilitate’, ‘serve’, ‘help’, ‘use’, ‘allow’, ‘implement’, and ‘application’. Modal auxiliaries and the simple present tense may also be used to report the practical applications of the findings.

Illustrative examples of this constituent option, with the linguistic components associated with this option underlined, are the following:

e.g.1. The findings from such a study would facilitate the planning of strategies... (RA 4)

e.g.2. These results may serve as a basis for further morphological studies related to ageing and specific diseases... (RA 2)

e.g.3. These results have obvious applications in noise reduction in air-conditioning and forced-air heating units... Right choice of undulations will help in cutting off most, if not all, modes in such ducts. (RA 12)

e.g.4. This interface can be used for data acquisition on any IBM PC or compatible with any empty slot. This interface allows for the collecting of data.... By using this interface, several measurement methods (e.g., [4])... can now be implemented on PC's. (RA 9)

5.5.2.9. Limitation

In this move, ‘the writers introduce one or more caveats about the findings’ (Dudley-Evans, 1994: 225). In the following instance, the RA authors make use of lexical signals to indicate that the outcome suffers from some limitation. In the first sentence of the following example, the ‘Limitation’ is signalled lexically by the verb ‘need’, while in the second sentence it is expressed by a negative adverb, and a verb phrase negation.

e.g. At the same time, a favorable response to iron treatment in children who were not iron deficient may need an explanation. Unfortunately, serum ferritin concentrations, which may offer a more accurate basis than SAI for evaluation of iron deficiency status, were not measured in this study. (RA 1)

5.5.2.10. Stating overall research outcome

This move tends to state whether the main research purpose outlined in the Introduction section is attained, and/ or to sum up the significant results. Thus, this move contains the following constituent options:

A) Highlighting the achievement of the research objective

Highlighting the achievement of the objective of the study is one of the main occasions where the RA writer relates what actually has been achieved to the original objective

stated in Move 3- Step 3, Outlining the Purpose', of the RA Introduction section. The Introduction purposive move and the Discussion objective achievement move, together with typical examples culled from RA Introductions and Discussion sections are given in the following table.

Table 5.17 Introduction Purposive Move compared to Discussion Objective Achievement Move

Outlining a purpose	Highlighting the achievement of the objective
We here present the <u>result</u> of a double-blind, placebo-controlled clinical trial evaluating the efficacy of iron therapy in BHS.	In conclusion, our results <u>show</u> that iron therapy is effective in the treatment of BHS. (RA 1)
In this paper, <u>we use the method of multiple scale to analyze linear waves propagating</u> in a rectangular hard-walled duct whose walls have weak periodic undulations.	<u>An analysis is presented for the propagation of sound waves</u> in rectangular ducts whose walls have periodic wave undulations. (RA 12)
..., <u>we describe</u> in this paper a simple but yet flexible interface which has these features.	The design and hardware/software implementation of a flexible multichannel <u>interface card has been described</u> in this paper. (RA 9)
The goal of the present investigation is to <u>describe</u> the morphological characteristics of Golgi-impregnated neuronal cell types in the AHA and SON of the adult human hypothalamus...	The present study provides detailed <u>cytoarchitectural descriptions</u> of different neuronal cell types in the AHA and SON of the human hypothalamus...(RA 2)
In this paper we constrain the effective couplings of the top quark to gauge bosons...and discuss how the measurement of these couplings can be improved by direct detection of the top quark...	e.g. This illustrates how one may be able to probe the symmetry breaking sector by measuring the effective couplings of the top quark to gauge bosons. (RA 11)

It is worthwhile to note that the RA writers in the above examples use the present simple tense to outline the purpose of the study and to highlight the achievement of this objective.

B) Summarising

A writer may provide a summary of the main results at the end of the Discussion section or immediately before the Recommendation move.

Sometimes, a summary of the main findings may be given in a list form, as is shown in the first example below:

e.g.1. In the present study, a) there was no significant difference in the interpersonal relationship behaviors..., (b) male nursing students reported more desire to control ..., and c) third- and fourth- year nursing students had greater need to associate with people...(RA 4)

e.g.2. The analysis shows how these walls undulations result in generating propagating modes from excited modes. For these interacting modes, there is a passband if they propagate in the same direction and there is a stopband if they propagate in opposite directions. However, there exists a range of values for the wave numbers of the walls undulations with respect to cases of passband or stopband. (RA 12)

5.5.3. Move Structure of Integrated RA Results and Discussion sections

In addition to the list of moves identified by Dudley-Evans (1994) which were found to occur in the present RA corpus, other communicative moves were also encountered in the integrated Results and Discussion sections. The new communicative moves written in bold type, together with those documented by Dudley-Evans, are listed below the following table.

Table 5.18 Move structure of RA Results and Discussion sections

RA	Section	Move Structure	No. of Cycles	No. of Moves
Pharmacy	Results & Discussion	[11- 12- 2- 1- 6] [12- 1- 2- 1- 6- 8- 7- 10]	2	13
Chemistry	Results & Discussion Conclusion	[2- 1- 5- 7- 4- 1- 7] [2- 1- 5- 1] [5- 7- 2- 6- 5] [12- 2- 1- 5] [12- 1- 6- 5] [10.1- 10.2]	6	26
Physics (Applied)	Results & Discussion Conclusion	[2- 1- 5] [2- 1- 7- 4- 5] [2- 1- 4- 7- 1] [2- 1- 5] [10.2]	5	17
Law	No Title Conclusion	[11- 13- 9- 4- 7- 14- 7- 5- 7] [13- 3- 7- 9- 5] [13- 9- 14- 7- 5- 7] [13- 9- 3- 7][13- 9- 3- 7][13- 3- 7]	6	31
History	No Title	[11- 3- 4- 3- 4] [13- 4- 5- 7- 4- 1- 4] [15- 4- 13- 4- 7] [13- 4- 5] [13- 11- 4- 3- 4- 15- 4- 3] [1- 7- 15- 4- 15- 4- 1- 7] [11- 13- 5- 4- 13- 3- 4- 13- 3- 4- 7] [10.2]	8	48

- 1- Statement of result/finding
- 2- Referring to supporting data
- 3- Exemplification
- 4- Reference to previous research
 - 4A. support/agreement
 - 4B. disagreement
- 5- Explanation
- 6- (Un)expected outcome
- 7-Claim
 - 7A. Hypothetical conclusion,
 - 7B. Deduction
- 8- Recommendation
- 9- Limitation
- 10- Stating overall research outcome**
- 11- Information move
- 12- Describing experimental procedures**
- 13- Introducing a thesis**
- 14- Presenting supporting data**
- 15- Outlining earlier and /or subsequent development**

5.5.3.1. Moves Identified as not Appearing in Dudley-Evan's Model

After analysing the Results and Discussion sections of texts selected for this study, I identified the following moves that have not appeared in Dudley-Evans' model: Introducing a thesis, Presenting supporting data, Outlining prior and subsequent development, Describing experimental procedures, and Stating overall research outcome. The purpose of each of the new moves is described and exemplified.

5.5.3.1.1. Introducing a thesis

This move presents a view on a particular issue without necessarily taking a position on it. The texts that follow either support or refute the thesis statement. There were as many as 12 instances of this move encountered mainly in the Law and History RAs. Move cycles in my sample generally begin with the presentation of the main thesis. However, authors sometimes provide background information as a preparatory move before the main topic is presented. This move is exemplified in the table below.

5.5.3.1.2. Presenting supporting data

This move occurred in the law RA. The author submits previous exemplar legal cases as evidence in the courtroom for supporting or refuting the argument of the main thesis.

According to Bhatia (1993: 135-6), the structure of a legal case includes the following constituent elements:

- 1- 'Identifying the case'
- 2- 'Establishing facts of the case'
- 3- 'Arguing the case'
- 4- 'Pronouncing judgement'

Below is an example of a move cycle from the law RA which reflects the position, the content and the structure of the above two moves in relation to other moves. The following skeletal move cycle presents an argument entitled 'The Bank Duty of Care'. It is the title of the first condition of three that should be satisfied, according to the author's view, in order for a tortoise liability to exist. The title of this section and the other two provide an answer to the main research question posited in the Introduction section.

Table 5.19 Move Structure of 'The Bank Duty of Care' in the law RA Argument section

Move	Move Structure- [Signals (my emphasis)]
Background information	The Bank of England is the Government authority, which authorises banks ¹ and supervises their business. Such authorisation can be revoked by the Bank, <i>if it appears to it, inter alia</i> , that "the interests of depositors or potential depositors of the institution are in any other way threatened, whether by the manner in which the institution is conducting or proposes to conduct its affairs or for any other reason." ² Moreover, the Bank has the right to put restrictions on banks' business for the protection of the interests of depositors,...
Presenting the main thesis	It <u>could</u> be argued that under these provisions and Schedule 3 of the Act, the Bank is under a duty of care to ensure that authorised banks conduct their business in a "prudent manner."
Limitation	<u>However</u> , although it might be "foreseeable", for the Bank that its failure to implement the provisions of the Act would result in loss for banks' depositors, it is <u>not necessary</u> that it is under a duty of care towards those depositors.
Reference to previous research	There must exist, in addition to "foreseeability" what has long been labelled by courts as "proximity," ⁶
Claim (Hypothetical conclusion)	It is <u>highly probable</u> that English judges would not find that it is "just and reasonable" to impose a duty of care on the Bank of England,
Presenting supporting data 1. Identifying the case 2. Establishing facts of the case	e.g. Saville J. in <i>Johnson Matthey Plc. v. Arthur Young and the Governor of the Bank of England</i> ⁸ faced the question whether the provisions of the Act were sufficient to impose a duty of care on the Bank to protect the interests of authorised banks' depositors. In that case, which arose out of the collapse and subsequent rescue of Johnson Matthey Bankers Limited "JMB" by the Bank in October 1984, JMB

3. Arguing the case	and its parent company, Johnson Matthey Plc, “the parent company,” claimed that Arthur Young, the auditors of JMB, should have discovered and reported the way in which JMB was being run, and because of their failure to do so, JMB and its parent company sustained loss. In their <u>defence</u> , Arthur Young <u>asserted</u> , in third party proceeding against the Bank, that if they were found to be liable in the principal action, then they would be entitled to an indemnity or contribution from the Bank under the Civil Liability (Contribution) Act 1978. 9 Arthur Young based their claim, in the third party proceedings, that the Bank as a central bank, owed a duty of care, under the provision of the Act, to both JMB and its parent company to carry out its supervisory duties and powers with reasonable care and skill.
4. Describing pronouncing judgement	Saville J., relying on Lord Atkin’s speech in <i>Donoghue v. Stevenson</i> 10 and Lord Morris’s speech in <i>Dorset Yacht Co. v. Home Office</i> , 11 held that “apart from possible considerations of public policy, the Court must be satisfied that in the circumstances it is fair and reasonable for the duty of care to be owed to the person concerned.” ¹² He decided that the Bank did not owe the parent company, as a depositor of the collapsed bank, JMB, a duty to exercise reasonable care and skill in their supervision of its bank, <i>i.e.</i> JMB. He, <u>therefore</u> , <u>concluded</u> that the claim, alleging a duty owed by the Bank to the parent company, <u>disclosed no reasonable cause of action</u> .
Claim (Hypothetical conclusion)	One <u>would expect</u> that the English Courts would argue against the imposition of a duty of care on the Bank to the benefit of banks’ depositors under the recent provisions of the Act.
Explanation	This is <u>not because</u> it is difficult to find a basis for such a duty in the provisions of the Act, ¹⁷ <u>but mainly for</u> policy considerations. There are, at least, three policy considerations,
Claim (Deduction)	<u>So</u> , the failure of a supervised bank should not be thrown on the Bank’s shoulders. <u>Thus</u> , it is unlikely that English Courts would impose such a duty on the Bank of England.

Let us now consider the move structure organisational patterns of the above section. The first move, ‘Background information’, is meant to give the reader a good idea of the facts of the dispute. These facts need to be established by bringing in a detailed account of what actually happened that led to the dispute and by giving an account of the legal system relevant to the problem. The second move has the function of presenting the thesis of the argument. Signals of the latter move are the modal auxiliary ‘could’, and the lexical item ‘argue’ underlined in the above table. Then the author introduces a caveat in a form of an antithesis or an expressed limitation initiated by the adversative sentence connector, ‘However’ and a negation in the verb complement ‘not necessary’ as signals of the ‘Limitation’ move. Then the author refers to previous research, followed by a hypothetical conclusion.

The sixth move presents supporting data or legal cases. It is an essential move in the area of legal argumentation, according to the author.

It is worth noting that the sixth move is too generalised to include 'Presenting legal cases', which is recognised by Bhatia (1993) as a separate genre, having an identifiable purpose articulated throughout the four distinguished moves mentioned earlier. As is shown in the table above, information structuring of legal cases commonly follows that promoted by Bhatia (ibid.). However, the author of the present RA provided a very brief account of the legal case, in comparison to legal cases presented in courts or in legal textbooks, where the lawyer and the author bring in detailed accounts of cases. As an illustration of the legal case information structure posited by Bhatia, let us take an example from the above table. The author begins with 'Identifying the case'. The italicised title *Johnson Matthey Plc. v. Arthur Young and the Governor of the Bank of England*[8] identifies the parties of the dispute written on either side of the small (v.) followed by a citation of the year the case was reported. In the second step, the author provides the reader with an account of the facts of the situation, and the proceedings of the case, a step which establishes the ground for the third step, 'Arguing the case'. The latter step takes the reader through an argument based on evidence. This component is signalled by the above underlined phrases in the text, such as, 'in their defence', 'based their claims'. The fourth step 'Describing pronouncing judgement' is indicated by the lexical item 'held' followed by a quotation from a precedent case used as a basis for judgement. This is called the principal of law derived by the judge, according to Bhatia (1993: 135). The judgement is further repeated in the two concluding sentences towards the end of the case.

After presenting supporting legal cases, the RA writer in the following 'Claim' move drew a hypothetical conclusion expressed by the modal auxiliary 'would', followed by the modal expression 'expect'. Then the writer brought in the 'Explanation' move. It is signalled by the causative conjunct 'because', and, finally, the move-cycle is closed with the 'Claim (Deduction)' move indicated by the result conjuncts, 'thus' and 'so' that tend 'to introduce expressing the consequence of what was said before' (Quirk, 1972: 669).

It is quite clear that the law RA is structured in a rather different way to other RAs. That is to say, I found that the RA genre contains another genre; it is rather like Chinese boxes. The law RA writer uses evidence based on another genre; that is 'Presenting legal cases', which are usually presented in courts, to support his arguments.

Similarly, the other two conditions, that should be satisfied in order to attain the main objective of the study, differ little in the way they are structured. These conditions were

presented in another two move cycles. They incorporated similar types of constituent moves.

5.5.3.1.3. Outlining earlier and subsequent development.

In this move, the writer brings in evidence or data from an earlier and/or subsequent period to the one covered in the present RA (Holmes, 1997: 325). Lexical signals indicating this move are the underlined items in the following examples culled from the History RA.

e.g.1. Grants of land (iqta‘at) started before ‘Uthoman, but they encreased, especially in the Sawad, under him. They were from vacant lands, mainly sawafi to sahabis.²³) (RA 16)

e.g.2. Revival of dead lands was probably open initially, especially where there were no rights or demand.³⁶) But supervision around Medina started early since ‘Umar put a time limit of three years for revival.³⁷) (RA 16)

e.g.3. On the other hand, the purchase of kharaj land by the ashraf, not forbidden initially,⁴⁶) became with time a threat to revenue. Under ‘Abd al-Malik,...., some kharaj lands which became ‘Ushri,... . By the time of Mansur this line was finally established. (RA 16)

5.5.3.1.4. Describing experimental procedures

According to some style guide prescriptions (Day, 1994), it is anticipated that authors will reserve describing procedural issues for the Methods sections only. What I found in the Results and Discussion sections of the articles examined, however, are other less common procedural moves used by authors of English language RAs.

The Pharmacy RA authors initiate each move cycle of the Results and Discussion section with lengthy and detailed accounts of procedures. They also name and cite procedures carried out by previous researchers before presenting the results as is demonstrated in the following example:

e.g.1. A simple method has been developed (Meyer *et al.*, 1982) whereby plant extracts, fractions, or pure compounds are tested at initial concentrations of 10, 100, 1000 ppm ($\mu\text{g/ml}$) in vials containing brine and ten shrimps in each of three replicates (McLaughlin, 1991). The assay is based on the fact that most active plant constituents are toxic to the brine shrimp at high concentration (Anderson *et al.*, 1988). Once the active plant species have been detected, a battery of more expensive and specialized bioassay can be done. The brine shrimp bioassay has been validated with hundreds of pharmacologically active components isolated from plants (McLaughlin, 1991; Meyer *et al.*, 1982; Alkofahi *et al.*, 1988).

As described in the original method, we tested each extract in triplicate with ten shrimps at each of three doses, and recorded the percentage of death after a 24 hour incubation period (Meyer *et al.*,1982). The results are listed in Table 2. ...(RA 5)

e.g.2. The mutagenic test was performed by adding 10 mg of each extract to two strains (TA 98 and TA 102) of *Salmonella typimurium*, and the incidence and the degree of mutagenicity among the samples were expressed according to the scheme suggested by Maron and Ames (1983). (RA 5)

Each of the above procedural moves was used as a cycle opener in the Results and Discussion section of the pharmacy RA. This is due to the fact that this RA presents two types of experimental results derived from the choice of two different procedures; the first is based on the ‘toxic activity’ of plants while the second is based on the ‘mutagenic test’.

The author was asked whether there is a rhetorical justification for the inclusion of these moves in this particular section. He pointed out that the rationale of including these moves at the beginning of a section designed for Results and Discussion is to draw the reader’s attention to this particular new and simple method as an alternative to other time-consuming and complicated methods. The author also explained why the particular materials (the eggs of the brine shrimp and the active plant constituents) were used. He indicated that the eggs of the brine shrimp were used because they were ‘available commercially at low cost and can remain viable for years in the dry state’. Added to this is ‘the fact that most active plant constituents are toxic to the brine shrimp at high concentration’. In the pharmacy RA text, the authors included a table which displays the results of using these selective techniques and materials.

This may be seen as an appeal to peer researchers to use these procedures and justify the validity of using them on the one hand, and to give an immediate explanation of the results on the other. Therefore, the results relevant to each procedure are supposed to appear immediately tied to it. According to the author’s claim, what matters in including these procedural moves is not what materials and methods are used but why they are used.

5.5.3.1.5. Stating overall research outcome

A) Highlighting achievement of research objectives

This move contains a confirmation of the attainment of research objectives. It occurred in chemistry and pharmacy RAs. For example:

e.g.1. Methanol was found to enhance the dissolution of Ti. (RA7)

e.g.2. In conclusion, these results have encouraged us to isolate the toxic components from *Eminium spiculatum* by using various chromatographic techniques guided by brine shrimp toxicity assay for identification of the bioactive components. (RA 5)

The pharmacy RA author confirmed that the function of the second example above, which is the final move in the RA, is to state the achievement of the overall research outcome. Instances of this move commonly appear towards the end of the RA.

B) Summarising

Summarising occurs typically at the end of the RA, and generally before the 'Recommendation Move'. This step may be signalled by a separate heading 'Conclusion' as is the case in the applied physics and law RAs; or it may be initiated by the lexical item 'In conclusion' and followed by a summary of the main results as in the following skeletal example:

'4. CONCLUSION

According to the simulation results,... the following conclusions can be derived.

1. Increasing the storage tank height above 1.0 m has no significant effect on solar fraction...
2. The solar fraction increases rapidly to nearly constant values as the tank volume is increased to about 150-200 l for 4 m² collector...
3. Except for systems with small...collectors, the solar fraction increases rapidly to a maximum or nearly constant value as the ratio of the tank volume to the collector area is raised...
4. With a 4 m² collector, the solar fraction decreases from 0.85-0.95 to 0.5-0.6 as the load temperature increases from 50 to 80°C; similar decreases from 0.65 to 0.35 are observed with a 2 m² collector.' (RA 10)

Similarly, the RA author of chemistry provided a summary of the main results.

However, a comment on the information included in the Conclusion section of the law and history RAs is necessary. Let us take the Conclusion section of the law RA. In a 47 line conclusion, the author gives a summary of the main points from the three headings 'The Bank's duty of care', 'Loss caused by the breach of the Bank's duty of care', and 'Loss is recoverable' included in the body (what is called Discussion for the sake of comparability with other RAs). The Conclusion of the law RA is presented in the following three move cycles, each of which is a summary of one of the aforementioned headings from the main body of the RA. The moves contained in each cycle are very brief and each includes the core information of the original moves of the three move

cycles constituting the headings of the main argument. The first and the second move cycles included in the Conclusion section of the law RA have the following organisational pattern:

Move 1. Introducing a thesis

Move 2. Limitation

Move 3. Exemplification

Move 4. Claim (Deduction).

However, the third move cycle has shown the following organisation:

Move 1. Introducing a thesis

Move 2. Exemplification

Move 3. Claim (Deduction).

The structure of the Conclusion section resembles that which I call the 'body' or the argument, fairly closely. However, there is a point that needs further illustration. The 'presenting supporting data' move encountered in the argument section is replaced in the Conclusion section by the 'Exemplification' move. Unsurprisingly, the author in the Conclusion section provides exemplar legal cases without any further identification of the case, establishing facts about the legal case or arguing it. Furthermore, the 'Exemplification' moves in the Conclusion are initiated by the lexical signal 'for example'.

5.5.3.2. Moves Documented as Appearing in Dudley-Evans' Model

Taking Dudley-Evans' list of moves as a reference, I have analysed the Results and Discussion sections which occurred as integrated sections in the sample of RAs, to see which moves are used by writers. The results of the analysis show that the following moves occurred in the data.

1- Statement of result/finding

2- Information move

3- Referring to supporting data

4- Exemplification

5- Reference to previous research

A. support/agreement

B. disagreement

6- Explanation

7- (Un)expected outcome

8- Claim

A. Hypothetical conclusion,

B. Deduction

9- Recommendation

10- Limitation

In the previous Results, and Discussion sections, I provided examples of the above moves and the scope of each move was described. However, in what follows, I will exemplify each move as it appeared in this particular section.

1. (Un)expected outcome

In this move the authors express either a significant or a non-consistent outcome as is shown in the following examples.

e.g.1. The extract of *Eminium spiculatum* was the only one to show any activity producing an ED₅₀... (RA 5)

e.g.2. The Ti electrode does not develop the same stationary potential in solutions of equimolar concentrations of the various oxidising agents ... (RA 7)

The significance of the outcome in the first example above is indicated by the underlined lexemes 'the only one', whereas the outcome is signalled lexically by 'show'. On the other hand, the non-consistent finding is indicated by the verb negation underlined in the second instance above.

2. Referring to supporting data

e.g.1 The potentiostatic polarisation curves for Ti ... are shown in Fig. 1.

Curve 8 represents also the anodic polarisation curves of Ti ...

The curves in Fig. 2 represent the variation of the open circuit potential ... (RA 7)

e.g.2 The effect of the storage tank volume ... is given in Fig. 3. (RA 10)

3. Statement of result/finding

e.g.1 ...Ti electrode exhibited two kinds of anodic polarisation curves. (RA 7)

e.g.2 Increasing V_t from 60 l to approximately 150 l results in an increase in solar fraction

In the region where V_t increases from 150 to 400 l, the curves exhibit different trends depending on H_t and T_{set} .

As A_c is increased (Fig. 5), the effect of V_t/A_c on the solar fraction becomes evident...

A further increase in A_c will decrease the optimum or recommended value of ...

A small effect is observed only when $T_{set} = 50$ C. (RA 10)

4. Reference to previous research (Support)

e.g.1 A similar result is found in Ref. [11] ...

Buckles and Klein [16] found that, for the same reason, the annual solar fraction was higher ... (RA 10)

5. Exemplification

‘A writer gives an example to support his or her explanation’ (Hopkins and Dudley-Evans 1988: 118).

All instances of exemplification encountered in the Results and Discussion section of the present corpus occurred in the law and history RAs (10 instances).

Lexical items such as ‘For example’ and ‘In this example’ tend to signal this move.

6. Information move

e.g1. The eggs of brine shrimp, *Artemia salina* (Leach), are available commercially at low cost and can remain viable for years in the dry state. (RA 5)

7. Explanation

Signals of this move are the following underlined constructions.

A) modal auxiliaries like ‘could’, or ‘may’, followed by an explicit lexeme indicating an explanation;

e.g1. This may be due to an increase in the field of strength through adsorption of Cl⁻ resulting from the reduction of KClO₃ at the surface of the metal. (RA 7)

B) explicit preparatory lexical items indicating explanations such as *explain*, *due to*, *denote*, *give rise to* as is shown in the following examples:

e.g.1 This denotes the specificity of the action of the corresponding oxidising agents. The necessary electrons for the reduction process are furnished from the ionisation of the Ti atoms entering the oxide phase. The last reaction gives rise to an anodic current density ..., which polarises the electrode, and shifts its potential in the positive direction. (RA 7)

e.g.2 The explanation of this result is that the larger storage tank has a large surface area and thus large energy losses. ..., the solar fraction of the system is slightly lower than that for lesser volumes, due to higher thermal losses from the larger tank surface areas. (RA 10)

8.1. Claim (Hypothetical conclusion)

Some of the signals indicating such options are modals and/or modal expressions as is illustrated in the examples listed below:

e.g1. This indicates the activity of the Ti electrode in such solvents and reinforces the fact that these solutions did not contain free water molecules which are necessary for passivation. (RA 7)

e.g.2 From these figures, it can be seen that the optimum or recommended value of V_i/A_c for A_c is the same for all T_{set} values. (RA 10)

e.g.3 It is highly probable that English judges would not find that it is “just and reasonable” to impose a duty of care on the Bank of England,

One would expect that the English Courts would argue against the imposition of a duty of care on the Bank to the benefit of banks’ depositors under the recent provisions of the Act. (RA 15)

8.2. Claim (deduction)

According to Dudley-Evans (1994), ‘deduction’ is an unhedged claim, which is confidently presented. Signals of this move are the underlined lexical items in the following examples:

e.g.1 Upon including that H_2O which comes initially from the aqueous HCl , it can be concluded that this corresponds to a molar ratio of water to protons of $>4:1$.

This implies that free water molecules exist in solutions only at ratios greater than this value. (RA 7)

e.g.2 This suggests that the desired value of H_i is 1.0 m for all considered values of T_{set} . (RA 10)

e.g.3 It is obvious that there should be at first an act of negligence by the Bank,...; and then causation between them. (RA 15)

5.5.4. Disciplinary Variation within RA Results and Discussion Sections

The analysis of the Results and Discussion sections showed disciplinary variations at both levels: i) section level, and ii) move structure level.

5.5.4.1. Section Variations

Contrary to the conventional IMRD format of organisation found in the RA, some writers closed their RAs with the Results section. Chemical engineering, statistics and algebra RAs in the present corpus do that without including a Discussion section to interpret, compare, or recommend on the bases of the results obtained. Results and Discussion sections also displayed marked disciplinary variations in the number and nomenclature of headings assigned to sections. Half of the writers in the present RA corpus presented their results in a separate section labelled either ‘Results’ or titled by the heading of the topic to be investigated. Apart from the writers who closed their RAs

with the Results sections, other researchers placed the interpretation of their results in a subsequent separate part, which also displayed three variations in headings: 'Discussion', 'Discussion or Conclusion', and 'Conclusion'. Still others integrated both sections under the 'Results and Discussion' followed by the 'Conclusion' section. However, the history and law RAs in the present corpus had rather more distinct sections. They did not contain a section entitled Result and Discussion. The law RA section was titled by the topics to be presented and discussed, whereas the history RA had no titles.

Although Dudley-Evans' communicative moves were discernible in the Results and the Discussion sections of our corpus, with varying degrees of frequency, there were other moves, which were not contained in his model, which nevertheless, occurred in the present corpus. It seems also that there is no completely obligatory move to be found in the cross-disciplinary corpus.

5.5.4.2. Move Structure Variation

Move structure analysis demonstrated that Results and Discussion sections contained more move structure variations in the type of moves, move sequence predictability, and complexity than that indicated by Evans' model or style guides. Below, I will consider each of these marked variations in turn.

5.5.4.2.1. Move Type Variations

We have noted that writers employ the following moves in their Results sections: 'Statement of finding', 'Referring to supporting data', 'Explanation', '(Un)expected outcome', and 'Claim' moves. On the other hand, it appears that the Results sections do not merely state results but also further interpret them despite the fact that these results are discussed in the following Discussion sections. This marked tendency is in some sense a deviation from the IMRD format prescriptions mandated by stylists, as they anticipate that the findings should be further explained in the Discussion, not in the Results sections. The latter section is meant to be restricted to presenting findings, referring to supporting data, and exemplifying findings.

With regard to the statistics and algebra RAs' closing Results sections, they displayed anomalous types of moves and move structure, very different from that encountered in the other disciplines. The move structure of the maths RA Results sections proceeds in

a similar fashion including moves usually presented in the following order, albeit with variation in the number of move cycles contained in each section:

1. Introducing a theoretical proposition (a lemma, a theorem, a corollary)

2. Presenting a proof/solution

- A) Limiting assumptions

- B) Preliminary hypothetical results

3. Statement of result

Both writers of maths RAs commonly close the move cycles of the Results sections with the 'Statement of result' move. It is worth mentioning that the first and the last moves of a move cycle of maths RA Results sections contain end results; unsurprisingly, the first move contains a brief account of the end result because 'in this discipline, one invariably needs to work backwards to solve mathematical problems' (Bhatia, 1993: 82). However, according to Dudley-Evans (1994), Statement of Results or Finding moves tend to occur as frequent openers of the move cycles of the Results sections.

With regard to RAs containing an integrated Results and Discussion section and those including separate Discussion sections, I found that the majority of these sections, apart from the law and history RAs, displayed communicative moves similar to those proposed by Dudley-Evans' model. Although the Discussion and the integrated Results and Discussion sections *demonstrate similarities in the type of moves presented*, the proportion of Results' moves (Statement of finding, and Referring to supporting data moves) in the Results and Discussion section is higher than that in the separate Discussion sections. This particular distinctiveness could be because RA writers who write separate Discussion sections select only significant Results to be further discussed and simply present the results in a separate section. On the other hand, in the integrated Results and Discussion section, writers exhibit most of the results pertinent to the RA since it has no separate Results section.

It is also noteworthy that the example texts of history and law RAs demonstrated communicative moves not recognised in Dudley-Evans' list of moves. These are 'Introducing a thesis', 'Presenting supporting data', and 'Outlining prior or subsequent development'.

Additionally, the Results and Discussion of the pharmacy RA included procedural description moves. According to Day's (1994) style guide prescriptions, these moves are not allowed in this section.

5.5.4.2.2. Move Order Variation

With respect to move order in the Results and the Discussion sections, we might also note that the sequence of moves is not as predictable as that reported in Dudley-Evans' model and that cited in Swales (1990). The latter claimed that move structural patterns tend to recur in a predictable order. For example, our study revealed that there was no completely cross-disciplinary obligatory move encountered in the Results and the Discussion sections. Although Peng (1987) and Dudley-Evans (1994) found that each move cycle was headed by the 'Statement of Result' as an obligatory move cycle opener, we noticed that this move is used as a move cycle closer in statistics and algebra RAs. In addition, we note the absence of this move in the law RA.

5.5.4.2.3. Move Structure Complexity and Cyclicity

The present analysis also indicated clearly that half of the separate Results and most of the integrated Results and Discussion sections displayed a cyclical organisation.

To identify move cycles, I adopted clues such as the division of text into separate sections or subsections under individual headings. In cases of longer texts, identification of move cycles was based on the content. Concerning cyclicity, half of the Results sections which appeared individually showed a linear organisation, while the others appeared to consist of more than one cycle varying in length depending on the number of moves included in each cycle. For example, the algebra Results section contains six move cycles, while statistics has four cycles, each of which contains three moves. Similarly, the anatomy RA Results section has four move cycles.

Illustrative examples of Results cyclicity are the algebra and statistics RAs in which the authors presented the proofs to obtain the desired results in sequential move cycles. Each move cycle contains a lemma or a theorem. These are headed by the 'Statement of a theoretical proposition' move, followed by another move consisting of proof steps, and terminated by a 'Statement of result/finding'. Commonly, each move cycle is referred to in the following cycles.

Similarly, Discussion sections and the coalescent Results and Discussion sections were found to consist of one or more cycles. It is evident that the number of research questions or the discussion of the results obtained as a consequence of applying more than one procedure is responsible for how long the sections are. This length gives rise to the cyclical organisation of these sections.

The cyclical pattern emerging in the Results and the integrated Results and Discussion sections is generally due to one or more of the following reasons:

- 1- presenting results in more than one sub-section (e.g. anatomy Results section),
- 2- the length of the Results section (e.g. paediatrics),
- 3- the number of experiments being reported (e.g. chemistry, and pharmacy),
- 4- the number of theoretical propositions introduced (e.g. algebra, statistics),
- 5- the complexity of the experimental design (e.g. applied physics), and
- 6- answering more than one research question (e.g. chemistry Results and Discussion section and law Discussion sections).

5.6. CONCLUSION

The basic question which motivated the researcher is how far Swales' notion of genre can be generalised as cross-disciplinary. One way to gain insight into the rhetorical organisation of genre is to analyse the structure of the product.

Careful examination of the structure of 16 RAs drawn from various disciplines reveals disciplinary organisational variations at the move level in terms of the number of moves included in each section and the way they are structured. There are also variations at the section level in that some of the conventional four sections (IMRD) are absent from certain disciplines; such as the RAs of maths, law, history, and chemical engineering.

There are disciplinary variations with regard to the presence or absence of certain moves, the number and order of moves, as well as the number and complexity of move cycles. Some sections further contain moves that should be included in other sections. Thus, we conclude that our investigation has demonstrated that the examined RA sections exhibit a more varied structure than would be indicated by the organisational patterns proposed by Swales and other genre researchers, as well as style guide prescriptions.

However, it appears that the organisational structure of the exemplar texts of medical sciences and chemistry RAs is quite similar in that they follow the (IMRD) format. Besides, RA writers exhibit a preference for employing Swales' CARS model in structuring their Introductions and often exhibit the same order.

Nevertheless, the generic model is not consistent. For example, medical science and chemistry RA exemplar texts could be categorised as central RAs since they reveal

resemblances in features that may be mapped from the notion of prototype suggested by Swales (1990). On the other hand, the maths, history and law RAs showed marked variations in their macro-structures and microstructures to the extent that they could be thought of as marginal exemplar RAs.

It should be noted that the number of exemplar texts used for genre analysis is limited due to the fact that I conducted a 'bottom-up' and a 'top-down' text analysis focusing on the entire 16 RAs. Given this limitation, the indicative conclusions drawn here relate to the fact that each RA text analysed cannot display a prototypical discipline specific model. That is because it is difficult to establish a generic model based on a single text selected from each discipline.

However, the sample in question does display the existence of substantial differences in rhetorical structures between the items in question. These differences may be indicative of wider field motivated generic differences but, of course, on the basis of the limited corpus discussed no firm assertion can be made in this respect.

The other conclusion which can be drawn from this study is that the RA writers in this sample employ particular and largely unacknowledged rhetorical organisational patterns that rely primarily on their communicative purposes. These are presented by a series of moves each of which constitutes a bundle of functions. An RA writer is expected to structure his RA employing certain type of moves rather than others to achieve the overall global communicative function of the RA in a particular discipline. Since we have encountered a variety of rhetorical patterns across disciplines manifested at the move and section levels, and since some of these disciplines appear to have specific functions that do not occur in other disciplines, it becomes quite obvious that the structure of the RA is driven by the nature of the enterprise. In other words, the specific needs of a discipline appear to control the particular functions. By carrying out these functions, the type of moves, in their complexity and cyclicity, achieve the global purpose of the RA genre. Thus, the purpose specificity of a discipline governs the behaviour of genre in that particular subject area. For example, the distinctive structural pattern of a maths RA could be attributed to the communicative purpose of the discipline. The maths RA does not have standard methods to follow because they are likely to provide an original solution to each problem; thus they do not have standard techniques to be followed. Likewise, they do not interpret, discuss, compare, or evaluate their results, so the interpersonal function of the Discussion section seems to be absent. In other words, the author communicates information quantitatively, logically and

objectively, thus, very little space is left to interpersonal relations. It seems that the argument in history and law RAs imposes form because the structure of the argument grows from within rather than from outside.

It is possible to conclude that the communicative function which is articulated by the type and number of moves, cycles or sections to be included in that genre is driven by the nature of the discipline, or at the micro-level by the nature of the topic under discussion.

6. Data Analysis: Interviews

6.0. Introduction

As mentioned earlier in the Methodology Chapter, the present research was based on personal semi-structured interviews, the choice of which is related to the specificity of the intent of the study; that is to elicit information on the RA writers' consciousness of RA genre structure.

In this chapter, I will investigate in depth the authors' descriptions of how they organise their RAs in terms of the component sections that go together to form the overall structure of the RAs. I will also consider some of the RA writers' accounts of their composition practices.

The results of the interview data reported in this chapter will be presented and discussed in three sections according to the objectives of the questions pertinent to each section. The first contains questions addressed to all the interviewees. The main theme of these questions is related to the RA writers' awareness of the RA generic forms. The themes of the second section centre on issues of composing strategies and RA writing practices. This section was only posed to twelve interviewees. The third section contains the respondents' comments on what our textual RA genre analysis suggests to them. It is worthwhile remembering that the results of this Chapter complement the results obtained from the RA genre text analysis presented in Chapter Five which revealed how far the RA generic model is reflected in the writers' texts.

It should be mentioned that the respondents offered a variety of comments in response to the same question; this means that it was not convenient to calculate the data quantitatively.

6.1. Interview Data Analysis

In the following three sections of this chapter I will present and discuss the data elicited during the above-mentioned interviews. Each section will be analysed separately.

6.1.1. RA Authors' Expressed Awareness of RA Texts' Generic Structures

The themes that motivate this section are related to the RA's generic rhetorical organisation; that is to say what sections and constituent moves the writers think of when they write a primary RA. In what follows, I will present the interviewees' responses with respect to each topic.

6.1.1.1. Interview Topic One: The type of sections that RA writers include in their research articles

The main aim of the questions relevant to this topic is to find out whether disciplinary variations affect the general patterns of organisation of the RA at the section level. The participants' accounts obtained throughout the interview are presented in Table 6.1 below.

Table 6.1 RA writers' consciousness of RA organisational sections

RA	Structure (Sections)	No. of Sections
Paediatrics	Introduction, Methodology, Results, Discussion	4
Anatomy	Introduction, Materials & Methods, Results, Discussion	4
Surgery	Introduction, Patients & Methods, Results, Discussion	4
Nursing	Introduction, Literature Review, Methodology, Results, Discussion	5
Pharmacy	Introduction, Materials & Methods, Results, Discussion	4
Zoology	Introduction, Materials & Methods, Results, Discussion	4
Chemistry	Introduction, Experimental, Results and Discussion, Conclusion	4
Chemical Engineering	Introduction, Experimental set-up, Results and Discussion	3
Electrical Engineering	Introduction, Formulation of the Problem, Proposed Algorithm, Simulation & Verification, Conclusion	5
Physics (Applied)	Introduction, System Description & Simulation, Results & Discussion, Conclusion	4
Physics (Theoretical)	Introduction, Body, (optional Discussion & Conclusion)	2
Mathematics (Applied)	Introduction, The Problem, Method of Solution, Conclusion	4
Mathematics (Statistics)	Introduction, Results	2
Mathematics (Algebra)	Introduction, Results	2
Law	Introduction, Substance, Conclusion	3
History	Introduction, Body	2

As can be seen in the table above, all the participants divide their RAs into sections although the number of sections employed and their titles vary. There is some similarity in the way writers of the zoology, pharmacy, anatomy, paediatrics, surgery and nursing RAs organise their articles. They employ the IMRD formats. However, there are slight

differences in the number of sections included and the way the participants title these sections. For example, the nursing RA writer employs a separate section entitled 'Literature Review' in addition to the IMRD format. The anatomy, pharmacy and the zoology RA writers have an integrated section entitled 'Materials and Methods', whereas the surgery RA writer names this section 'Patients and Methods'. Apart from the fact that the chemistry RA writer assigns a separate section for the 'Conclusion', he also includes organisational patterns similar to those used by the chemical engineering RA writer. Algebra, statistics, pure physics and history RA writers, in the present sample, include only two sections (Introduction and Body or Introduction and Results) in their RAs. The pure physics RA writer stated that he sometimes adds an integrated section named 'Discussion and Conclusion'.

The organisational patterns employed by the electrical engineering RA writers bear resemblance to those employed by the applied maths RA writer in that both of them adopt the following sequence: 'Introduction, The Problem, Method of Solution and Conclusion', except that the former writers include a 'Verification and Simulation' section.

It is worth noting that the RA writers in algebra and statistics have neither a section for Methods nor another for Discussion. When the writers of these RAs were asked about the reason for not including these sections, one said,

'In maths we don't have prepared data to work with and analyse mathematically. We start directly presenting mental proofs leading to the results in the Results section. The RA commonly contains an Introduction followed by the body or the Results which includes lemmas and theorems presented in a logical sequence. That is to say, the proof of the subsequent theorems will be based on the proof of the preceding ones. The proof of all of these theorems will finally give the desired results'.

Regarding the reasons for not including a Discussion section to compare their results with those of other researchers for support or disagreement purposes, he stated that;

'In most of our research we can't start with a problem if somebody else has solved it'.

Likewise, the RA writers in law and history pointed out that the absence of the Methods sections in their RAs' organisational patterns is attributed to the nature of the disciplines. Methods sections of these disciplines have no experimental procedures based on raw data, such as materials or equipment. What historians are concerned with is recounting, arguing and discussing events, whereas law RA writers are commonly

interested in presenting previous legal cases from the records of the court as bases for their arguments.

I noticed also that there is no separate 'Discussion' section in the organisational patterns of the electrical engineering RA. Instead, the researcher said that he usually attempts to persuade the peer researchers of the validity of his proposed design in a section entitled 'Simulation and Verification'. This section basically contains Methodology to convince the audience that the system is working within the norms or conditions within which they claimed that the design would behave properly.

So far, data analysis has revealed the existence of other sections not documented by the IMRD proposed model, and that there are variations in the way RA writers title and present the organisational patterns of their RAs across disciplines.

6.1.1.2. Interview Topic Two: RA writers' knowledge of Move- Step differentiation in the RA Introduction

The purpose of the questions relevant to this topic was to elicit information about the type and sequence of rhetorical components, moves, or steps RA writers employ in the process of structuring their Introductions. The elicited data may indicate to what extent RA writers make use of Swales' (1990) 3- Move model of Introductions in the process of writing.

The results of the interviews revealed that the participant writers use categories that bear some similarity to those put forward by Swales (1990) for the RA Introductions. However, unsurprisingly, there is no uniform way in which the nomenclature of the constituent components are used by the participants. Therefore, a comment about the different names of the constituent elements they include in their Introduction sections is necessary.

I adopted the components of Swales' CARS model to which the responses of the participants were compared. The responses gathered around Swales' moves and steps constituting the Introduction sections. For example, I assigned Swales' Move-2, Step- 2, 'Indicating a gap' for a group of responses such as 'Specifying a gap', 'Indicating a problem in the reviewed literature', 'Mention the area that has not been studied', 'Introducing a problem that has not been fully verified', 'To find something in the literature to add to or develop', and 'Highlighting the specific problem'. Likewise, for a group of other responses such as 'Providing a background about the subjects I am dealing with', 'Background about the problem', 'Giving general information about the

topic’, and ‘Identifying the main problem in general’, Swales’ Move- 1, Step- 2, ‘Making topic generalisation(s)’ was assigned to represent these segments.

However, the responses of the participants included other components not documented by Swales (1990). For example, a category of responses such as ‘Motivation of the study’, ‘Significance of the study’, ‘Value of the study’, ‘Justification of the study’ has not been shown in Swales’ CARS model. Therefore, Move- 7, ‘Stating research motivation’ was used to indicate this category of responses.

The following adapted components were adopted and assigned to the participants’ responses concerning the rhetorical structure of the RA Introduction sections:

A) Moves put forward by Swales’ (1990) and used by the participants

Move 1 Establishing a territory

1- Background information

2- Reviewing items of previous literature

Move 2 Establishing a niche

3- Indicating a gap

Move 3 Occupying the niche

4- Outlining a purpose

5- Announcing principal findings

6- Indicating RA structure and/or content

B) Components employed by the participants but not documented as appearing in Swales’ Model

7- Stating research motivation

8- Reporting and/or discussing results of previous research

9- Preliminaries and definitions

10 -Indicating research methods

The following table shows the RA authors’ responses regarding the way they organise their RA Introductions. It demonstrates the number, type, and sequence of the components adopted by the participants from various disciplines.

Table 6.2 RA writers' consciousness of Move structure of RA Introduction sections

RA	Structure (Moves)	No. of Move units
Paediatrics	3- 2- 4	3
Anatomy	2- 3- 4- 7	4
Surgery	1- 2- 4	3
Nursing	3- 1- 7- 4	4
Pharmacy	1- 2- 3- 4- 7	5
Zoology	1- 2- 3- 4	4
Chemistry	1- 2- 3- 4	4
Chemical Engineering	2- 3- 4- 10	4
Electrical Engineering	2- 3- 5- 7	4
Physics (Applied)	7- 2- 8- 3- 4	5
Physics (Theoretical)	7- 2- 4	3
Maths (Applied)	2- 8- 4	3
Maths (Statistics)	1- 2- 4- 5- 9- 6	6
Maths (Algebra)	2- 3- 4- 5- 9	5
Law	4- 2- 3	3
History	4	1

We notice in Table 6.2 above that all the RA writers initiated their RAs with an Introduction section. It is also obvious as the tabulation of the responses indicates that they employed the constituent elements of Swales' three moves in structuring their Introductions, despite the fact that these components occurred with varying degree of regularity in the authors' responses. For example, steps such as 'Reviewing items of previous literature', 'Indicating a gap', and 'Outlining a purpose' tend to be employed as quasi-obligatory by the participants. However, these steps vary in the order of presentation. That is to say, at least half of the RA writers do not present the constituent elements of the Introduction section in the same order prescribed by Swales' model.

However, the nursing RA writer reviews items of previous literature in a separate section entitled 'Literature Review' following the Introduction section rather than including it in the Introduction.

The nursing RA writer was asked about the reason for including a separate section for the literature review. In answer to this question, she pointed out that she usually includes this section in order to establish common content background knowledge among the readers. She further explains that her writings are not only addressed to peers but are also addressed to other audiences such as practitioner nurses and undergraduate students. Further, inclusion of detailed paragraphs of the findings of previous literature in this particular section, according to her, highlights the shortcomings of these findings

so as to convince peers on the one hand, and to develop an interest and awareness in other audiences, of previous literature, on the other.

It is worthwhile to mention that the author and her colleagues did not include a separate section for the 'Literature Review' in the RA on which we conducted our generic text analysis. She justified not including a separate section for the review of literature by explaining that the reviewer of the journal asked the authors to shorten this section and to incorporate it within the Introduction section.

In addition to the communicative categories included in Swales' three moves, some other researchers reported that they make use of other options, such as 'Stating research motivation'. These are employed by 6 RA writers. 'Reporting and discussing results of previous research' is used by applied maths and applied physics participants. In statistics and algebra, the respondents use 'Preliminaries and definitions'. 'Indicating research methods' is also employed by the chemistry RA writer.

On the other hand, there are variations in the number of communicative elements used by each participant and the way s/he structures his/her Introduction. These Introductions ranged from a one-move section or a step section, as is the case in the history RA, to a section with a sequence of six steps, like that in statistics.

To conclude, the impression one gains is that there are a few variations in the way the participants from various disciplines structure their Introduction sections. More significantly, the present analysis revealed the existence and use of component steps not documented as appearing in Swales' prescribed model. In addition, the analysis showed the absence of some of component steps mentioned in Swales' model such as 'Claiming centrality', 'Continuing a tradition' and 'Question raising'. What gives rise to these new functional categories seems to be based in disciplinary variations.

6.1.1.3. Interview Topic Three: RA writers' knowledge of Move- Step differentiation in the RA Methods section

The aim of the third topic is to elicit an account of how the RA writers from different disciplines structure this section and to what extent their responses show conformity or variation.

The elicited data revealed that the RA participants commonly think of one or more of the following constituent components when they start writing their RA Methods sections. However, there are disciplinary variations in the type, number, and the way the RA writers order components in this particular section.

- 1- Background of the problem
- 2- Describing experimental procedures
- 3- Identifying materials and components
- 4- Limiting conditions
- 5- Describing a sample
- 6- Describing data collection procedures
- 7- Describing data analysis procedure
- 8- Simulation
- 9- Verification
- 10- Visual presentation of data
- 11- Explanation
- 12- Recommendation

As mentioned in Interview Topic Two, each of the moves above represents an underlying propositional function or related functions of a group of the participants' responses regarding a particular constituent component commonly included in the Methods sections. For example I used 'Describing experimental procedures' to represent the following group of the participants' responses: 'describing procedures', 'naming techniques and/or citing reference to a procedure', 'indicating which line of solution to be followed', 'introducing a mathematical model', 'formulating a model in the light of the introduced technique', 'introducing steps of solution', 'mentioning the method of cutting, drawing...', 'taking the measurements', 'formulating a theoretical design out of formulas and equations until the problem is clear and ready to be solved', 'biological testing', and 'obtaining ethical consent from the ethical committee'. Likewise, the 'Limiting conditions' move was used to correspond to the following segments of information elicited from the participants: 'describing the condition of the experiment', 'calculating the processes which may be relevant or to which the experiment is sensitive', and 'identifying the constraints relevant to the problem'.

The author of the applied maths RA pointed out that he commonly begins the Methods section with the 'Background of the problem' because in applied maths the problem, which is going to be solved, originates outside maths. Thus, he adopts a well-established mathematical model to solve a physical problem.

The 'Simulation' move is adopted to represent the segments of information elicited from the applied physics and the electrical engineering RA writers, such as, 'constructing a system according to the mathematical model you work with'. On the other hand, the 'Verification' move corresponds to 'making sure that the design or system is working properly under the limiting conditions specified by the author'. Similarly, I used the 'Identifying materials and components' move to represent a

constellation of responses like ‘naming materials and equipment’, ‘describing components’, ‘naming the equipment and chemicals used’, ‘identifying components of a design’, ‘describing components of the system you are working with’, and ‘indicating the atlas used to identify specifications’.

The elicited data regarding move structure of the respondents’ RA Methods sections are presented in Table 6.3 below.

Table 6.3 RA writers’ consciousness of Move- structure of RA Methods sections

RA	Section	Structure (Moves)	No. of Move units
Paediatrics	Methods	5- 7- 2	3
Anatomy	Materials & Methods	3- 5- 2- 3	4
Surgery	Patients & Methods	5- 2	2
Nursing	Methodology	6- 2-5	3
Pharmacy	Materials & Methods	3- 2- 3- 2	4
Zoology	Subjects & Methods	3- 2- 5- 7	4
Chemistry	Experimental	2- 4- 3	3
Chemical Eng.	Experimental Set up	4- 2- 10	3
Electrical Engineering	Formulation of the problem	1- 4	5
	Proposed Algorithm	2	
	Simulation & Verification	8- 9	
Physics (Applied)	System Description & Simulation	3- 2- 8	3
Physics (Theoretical)	Body or (Substance)	2- 4- 9- 11- 12	5
Maths (Applied)	The Problem	1- 2	3
	Method of Solution	2	
Maths (Statistics)	No Methods section	-	-
Maths (Algebra)	No Methods section	-	-
Law	No Methods section	-	-
History	No Methods section	-	-

The data in the table above is largely self-explanatory. It is obvious that there are considerable variations with regard to the presence or absence of this particular section. As mentioned elsewhere, writer participants of statistics, algebra, law, and history RAs reported that they commonly do not employ Methods sections. For those who include this particular section or an equivalent section to it, they employ largely different nomenclature that relies primarily on their communicative purpose. This is the case in surgery, where the RA writer employs ‘Patients and Methods’, whereas in chemical engineering and chemistry, the participants use ‘Experimental set up’ and ‘Experimental’ respectively, and in applied physics, they use ‘System description and mathematical model or simulation’. In the electrical engineering and applied maths RAs, respondents have more than one section to stand for Methods, but for the sake of comparability, the Methods section was used to subsume these sections.

At the move structure level, the table above indicates that the RA Methods sections are rather different in the number, type, and sequence of moves employed in each individual section. Regarding the type and the sequence of the communicative categories described by the participants, there seems to be little conformity in the type of components included. Likewise, these communicative components do not follow a prescribed strict order in their arrangement across disciplines. Furthermore, it is quite evident that some communicative components such as ‘describing procedures’ and ‘sampling procedures’ appear to be used more than other elements; that is to say, these procedural elements have a high frequency of use whereas some other elements are used only once.

It seems safe to say that there is little consistency in the number, type, and sequence of the components of the RA Methods sections employed by the respondents. There is also no standard nomenclature for Methods sections to be adopted by the RA writers across disciplines. To illustrate the latter point further, I take an example from maths. Even though the three branches of maths (algebra, statistics, and applied maths) exist in the Department of Maths, the RA writers use different methodologies. That is to say, the former two branches use mental proofs, although we cannot explicitly say that proofs are Methods. As one of the participants says ‘although a proof is not a method but it is a must for proving any theorem so that it can be added to an existed mathematical structure. In other words, any addition to the mathematical structure cannot be accepted unless it is proven by using mathematical logic. Thus, mathematical statements that have been proven are called theorems, and the only tool to prove a mathematical statement is the ‘proof’. Thus the proof is in a sense a tool’.

Therefore, it seems that maths has its own methods.

The RA writer of algebra stated the following in this domain:

‘There is no explicit Methods section in maths RAs. I think that the reason behind that is to instigate the reader to pursue the provided proofs so as to interact with them. Methodology is an implicit process that can be noticed throughout the lemmas and propositions.’

In applied maths, on the other hand, a RA writer takes a well established model from the mathematical area and applies it to a physical problem in the world in order to solve this problem and interpret it.

In conclusion one may say that there are different types of Methods employed by RA writers across disciplines ranging on a continuum from ‘abstract’ to ‘concrete’. If we

consider, metaphorically, mental proofs as ‘tools’ leading to results, thus we could consider them to stand towards the abstract end of the continuum. An example of this is algebra followed by statistics. Towards the middle of the continuum of ‘abstract vs. concrete’ stands the application of a mathematical model in the methodology section, as it is the case in applied maths, pure physics, and electrical engineering. This mathematical model is theory oriented rather than being based on concrete data such as ‘materials’ used in experimental disciplines, whereas towards the concrete end of the continuum stands the methodology of the other empirical studies. The results of these studies are based on the use of concrete materials including equipment, materials and subjects.

A further conclusion that can be drawn is that the titles of sections and patterns of organisation of the Methods sections at the section level, as well as at the move level seem to be driven by the nature of the subject area. The nature of the subject area dictates the choice of titles of the sections included and the pattern of organisation of the Methods section; this in turn drives the choice of the communicative purposes of the moves, at the move level. Added to this, our findings appear to provide evidence to support Swales’ preliminary expectations that ‘the major differences do not lie so much in Introduction and Discussions (where I believe most people would expect it) but rather in the Method and Results sections’ (1990: 175-176). These differences seem to act on the schematic background knowledge of the RA writers as has been elucidated so far, and also to work on the generic linguistic level as has been shown elsewhere in our analysis of the RA texts of the participants.

6.1.1.4. Interview Topic Four: RA writers’ knowledge of Move- Step differentiation in the RA Results and Discussion sections

The questions related to the above topic aim to examine how each participant organises this/these particular section(s) and to what extent the organisation of these sections varies across disciplines.

The analysis of the Discussion section put forward by Dudley-Evans (1994) and Hopkins and Dudley-Evans (1988) serves as a point of comparison with the participants’ responses concerning the organisation of the Results and the Discussion sections. For the sake of comparability with Dudley-Evans’ model, the elicited responses with regard to each constituent component were categorised according to their underlying shared communicative function. For example, I assign the ‘Statement

of finding' move to the following category of responses: 'reporting the findings', 'describing findings', 'verbal description of results', and 'presenting results without commenting on them'.

The following adapted moves were reported to be commonly adopted by the participants to structure the Results and Discussion sections. However, the RA writers utilise the communicative moves written in bold type to organise their Results sections when they are presented in a separate section.

1. **Statement of finding/result(s)**
2. **Visual presentation of results**
3. **Referring to supporting data**
4. **Describing data analysis procedures**
5. **Introducing a theoretical proposition**
 - a. a lemma
 - b. a theorem.
6. **Assumptions and limiting conditions**
7. **Presenting a proof**
8. **Restatement of the purpose**
9. Reference to previous research
10. Explanation
11. Limitation
12. Stating overall research outcome
13. Recommendation
14. (Un)expected outcome
15. Exemplification
16. Background Information
17. Introducing a thesis
18. Presenting legal cases
19. Claim
20. Conclusion
21. Evaluation

The participants' responses concerning the organisation of the Results and Discussion sections are tabulated below.

Table 6.4 RA writers' consciousness of Move- structure of RA Results and Discussion sections

RA	Section	Structure (Moves)	No. of Moves
Paediatrics	Results	1	1
	Discussion	16- 9- 10- 12- 13	5
Anatomy	Results	1- 3- 1- 2	4
	Discussion	12- 9- 10- 13	4
Surgery	Results	1	1
	Discussion	16- 9- 10	3
Nursing	Results	8- 2- 1	3
	Discussion	14- 15- 9- 13	4
Pharmacy	Results & Discussion	1- 2- 14- 9- 10- 13	6
Zoology	Results	4- 2- 1	3
	Discussion	14- 3- 9- 10- 11- 13	6
Chemistry	Results & Discussion	1- 9- 10	3
	Conclusion	8- 12	2
Chemical Eng.	Results & Discussion	14- 9- 12- 13	4
Electrical Eng.	Conclusion	12- 21	2
Physics (Applied)	Results & Discussion	2- 14- 10	3
	Conclusion	12	1
Physics (Theoretical)	Optional Discussion & Conclusion	14- 12- 19- 13	4
Maths (Applied)	Conclusion	12- 11- 9	3
Maths (Statistics)	Results	5- 6- 7	3
Maths (Algebra)	Results	5- 6- 7	3
Law	Substance	16- 18- 17- 19	4
	Conclusion	12	1
History	No Title	9- 17- 9- 15- 20	5

As we can see above, it must not be assumed that every RA writer follows a linear progression through all the 21 moves above; there is considerable variation in the number, type and sequence of moves used by each RA writer.

For example, the responses of the zoology RA writer tabulated above reveal that he presents his results and their discussions in two separate sections titled 'Results' and 'Discussion' having the structures 4- 2- 1 and 14- 3- 9- 10- 11- 13 respectively. The author pointed out that he is likely to begin the Results section by providing a description of the statistical treatment through which he obtained his results, followed by a visual representation of the results so as to give the reader a quick look at them. Then, he concludes the section with a verbal statement of findings without commenting on them. Regarding the components included in the Discussion section, the author said that he usually initiates this section with a paragraph containing statements of the significant results, with a simultaneous reference to supporting visual data. Then the RA writer relates his findings to those of other researchers in the same area of study,

followed by a justification and explanation of findings. Throughout the Discussion section, the author pointed out that he refers to the limitation of his study and opens many slots that need further research. Thus he concludes his Discussion section with recommendations for further studies to fill the open gaps and slots.

It is quite apparent that RA writers employ different titles for the Results and Discussion section, such as Results, Results and Discussion, Discussion and Conclusion, Conclusion, and Substance. Likewise, a discrepancy was observed with regard to the presentation of Results and their discussions, the presence or absence of the Discussion section and with regard to the integration of the Results section and the Discussion section into one section named 'Results and Discussion', or 'Body'. On the other hand, other researchers integrate Methods, Results, and Discussion into a section called 'Substance' as in the case of the pure physics RA without clear demarcations between these sections.

As is shown in Table 6.4 above, chemical engineering, chemistry and pharmacy RA participants integrated Results and Discussion sections under an encompassing title 'Results and Discussion'. Others, such as, algebra and statistics RA writers close their RAs with the Results section without any further attempt to situate their results in the context of previous literature. Another category of participants (e.g. applied maths, and electrical engineering RA writers) close their RAs with a 'Conclusion' section. As is mentioned earlier, they describe their procedures, steps of solution, and the subsequent desired results in one section, prior to the 'Conclusion' section.

Concerning the organisational patterns at the intrasection level, the participants employed communicative elements similar to those put forward by Dudley-Evans (1994) and Hopkins and Dudley-Evans (1988). Dudley-Evans' categories that are more or less similar to those of the above mentioned writers are: Statement of Result, Explanation, Reference to Previous Literature, Exemplification, Recommendation, Conclusion, and Limitation. On the other hand, it is apparent that the data analysis revealed the existence of communicative categories not documented as appearing in either the Results or the Discussion sections elsewhere. Examples of these communicative elements are 'Introducing a theoretical proposition either a lemma or a theorem', 'Giving a proof or a solution, and 'Assumptions and limiting conditions'.

The results of our analysis concerning this section showed that there are marked variations in the number of communicative categories commonly used by each of the

respondent authors in each section and in the way they organise these components. Again, it seems that the titles of these two sections whether, separated or integrated, and the type and number of moves included in each section are determined by the nature of the enterprise. That is to say, the variations in the communicative purposes of the enterprise give rise to the variation of the communicative categories used.

6.1.1.5. Interview Topic Five: 'Instructions to Authors'

The questions related to this theme aimed at finding out how far the rhetorical generic structure of the RA is guided by the notices, guidelines, or instructions to authors.

Journals, like *Journal of the Chemical Engineering data*, frequently publish manuscript preparation guides to reflect the policy of the journal in order 'to aid authors in writing and editors in expediting review publication' (Guide for Authors, 1990: 3A).

Table 6.5 Informants' responses regarding content of Instruction to Authors

RA	Title Page	Abstract	Section -ing	Table Fig.	Format	Permiss-ion	Ref.
Paediatrics		+	+			+	+
Anatomy					+	+	+
Surgery		+				+	
Nursing					+		
Pharmacy	+		+		+	+	+
Zoology			+				+
Chemistry	+		+				+
Chemical Engineering					+		
Electrical Engineering					+		+
Physics (Applied)				+	+		+
Physics (Theoretical)	+				+		+
Mathematics (Applied)							+
Mathematics (Statistics)	+	+			+		+
Mathematics (Algebra)			+		+		+
Law							+
History							

As is shown in Table 6.5 above, the responses of the RA writers revealed that 'Instructions to Authors' demand that each contribution generally should include some or all of the following components:

- 1- Title page: This should include the name and the affiliation
- 2- Abstract
- 3- Sectioning: This includes information related to the organisation of the body text.
- 4- References: This component contains reference style and examples of reference of journal articles, books, chapters in books, etc.
- 5- Tables, Figures and Illustrations

- 6- Formats: This includes letter quality, computer printout, typing, paper size, numbering and space.
- 7- Permissions: The researcher should obtain informed consent from the patient or the parent. This component is generally required in medical science RAs, especially in RAs describing research involving human subjects.

According to the RA writers' responses, manuscripts must adhere to certain physical requisites in order to be acceptable for publication in the journal. However most of these requirements appear to be related to the physical organisation, formatting, and referencing, rather than to the internal rhetorical organisation of the RA sections or the constituent components of each section. Nevertheless, five of the interviewees reported that a few journals in their speciality require that the RAs should be organised into certain sections.

To crosscheck the responses of the participants, I approached the 'Instruction to Authors' of the journals in which the RAs of the interviewees, included in the corpus, appeared.

What follows is a summary of the main components of instructions to contributors: title page, abstract, mathematical expressions, illustrations (tables, figures, graphs), referencing, formatting, spelling, main text, supplementary material, symbols and terminology, acknowledgement, permission from the patient, abbreviations, appendix, footnotes, language (e.g., Papers should be written in fluent English), etc.

Five of the participants claimed that the 'Instruction to Authors' of journals, in which they publish their RAs, guide the sectioning and the organisation of the articles. I further examined the 'Instructions to Authors' of these journals. Upon examination, I found that the *International Journal of Pharmacognosy* requires the well known IMRD format in that the body of the text should be organised into the following sections as much as possible: Introduction, Materials and Methods, Results, and Discussion. Likewise, the *Annals of Tropical Medicine and Parasitology* indicates that the body text includes these standard headings: Introduction, Materials and Methods (or where appropriate, Patients and Methods), Results, and Discussion. Authors may have a combined Results and Discussion section.

On the other hand, the 'Instruction to Authors' of the other journals, the *British Corrosion Journal*, the *Far East Journal of Mathematical Sciences*, and the *Journal of Pediatrics* do not mention headings or sectioning of the body text. However, I observed that the 'Abstract' of the *Journal of Pediatrics* needed to contain the following

headings: Objective(s); Study design, Results; and Conclusion(s). One may infer that the instructions concerning the organisation of the abstract, are reflections of what sections the body of the text should include. Interestingly, this provides support for Bhatia's (1993: 28) point that the abstract is a summary of the RA.

We conclude that, apart from the 'Instruction to Authors' of the *International Journal of Pharmacognosy*, the other journals in which the RAs analysed appeared do not require adherence to a particular intra-sectional or inter-sectional organisation in the main text of the manuscript. In other words, the internal organisation, headings, sectioning, and the order of presentation of the main body of the text is the author's choice rather than a response to the editor's instructions.

6.1.1.6. Discussion and Conclusion of Section One:

Our interview data demonstrated some consistency as well as discrepancies in the informants' consciousness of the RA genre model, in terms of the sections contained and the move structures of these sections. For example, all the participants revealed that they initiate their RAs with an Introduction section. Their elicited responses also show that there is some consistency, in terms of the predictability of the constituent components that tend to occur in the Introductions. However, apart from the Introduction sections, our qualitative data analysis revealed that there are variations in the way the RAs' sections are organised, not only at the move level but also in the number and type of sections included in each RA.

These findings suggest that there are generic variations at the schematic knowledge level, which in turn supplement and reflect the variation at the linguistic textual level that was demonstrated earlier in Chapter Five. These genre variations could be attributed to two sources: i) disciplinary variations, and ii) RA writers' schematic generic knowledge variations.

6.1.1.7. Disciplinary variation

In an attempt to produce a pedagogical model that is argued to have the power to cut across disciplines, pedagogists may have thought of a cross-disciplinary context as having relatively common communicative purposes. Commonality of purpose is anticipated to be reflected in unified intellectual programmatic procedures. This suggests that a given genre might be thought of as having a common purpose which is

in turn articulated by a common identifiable structure reflected in sections as is the case of the RA genre. Each section is built up of recognisable move structures. However, such a perspective removes genre from its context. Anson (1988) invites researchers to address the contextual variables to find out how much they constrain the writing strategies which in turn have an influence on the produced RA texts and how, accordingly, these texts vary across disciplines. The author maintains that

‘while separate disciplines may inhabit the same educational context and work toward similar generalized goals, they often embody quite different assumptions about the nature of written discourse-assumptions of audience, purpose, and the conventions of style and format. ... Clearly, we must begin to consider more fully the role of disciplinary context on the writing process and on learning to write (p. 3).’

Thus, our findings suggest that the variation in the organisation of the RAs is a translation of the communicative purposes, which appear to be influenced by epistemological factors. These epistemological purposes, in addition to other contextual variables such as peers who evaluate the task, the audience, and the kind of topic, have an influence on the organisation of the produced text. For example, writers of theoretical physics, and pure maths RAs, in this regard, stated that what matters is the originality of the ideas and the findings obtained, rather than the way in which the content is organised. That is to say, they care about what content is included more than about how this content is presented. Such findings suggest the reason for the variation of RA organisation across disciplines that has emerged in our data analysis. This conclusion lends support to Faigley and Hansen’ (1985) views. They indicate that in psychology, students are evaluated on the basis of their adherence to the RA organisational conventions in the subject area, whereas when students’ work is evaluated in sociology, more weight is given to ‘what knowledge the student had acquired than in how well the report was written’ (ibid: 147). Likewise, our conclusions coincide with those of Williamson (1988) concerning the reasons for the variety of models of writing across the curriculum. In this regard, the author points out that ‘each department in each institution, may have its own perspective on what students must learn in a writing course that addresses the needs of writing in the discipline’ (p. 130). Similarly, each researcher, according to Hansen’s (1988) view, ‘represents invention in a way consistent with the genres’ epistemological bases’ (p. 181). Thus, it becomes quite obvious that it is of dubious value to think of common generic patterns that always operate on all texts belonging to the same genre. This conclusion in turn supports

Dudley-Evans' (1993: 147) opinion that it is dangerous to teach common organisational patterns in academic writing which students think always apply in all subject areas.

b) Schematic generic knowledge variation

According to Graesser and Clark (1985: 32), 'Generic knowledge structures (GKSs) are structured summaries or abstractions of sets of exemplars'. If we take the GKS of the RA as an example and apply the above definition to it, we metaphorically encounter the IMRD format that could be said to stand for the GKS of the organisation of a RA. This generic format at the abstract level does not represent a typical experience or a particular RA exemplar. Rather, it is an abstract global structure formulated out of reading and writing many RAs each of which has its contextual constraints, like field, audience, and communicative purpose specificity. Thus RA schematic structural patterns are presumably moulded by the writer's experience which consists in fact of reading and writing many RAs, each of which represents a different but a related experience. However, I think this can be explained with reference to a balanced model that combines generic knowledge macro-structures and generic knowledge micro-structures. The former type of knowledge may be postulated to cut across the RA genre. Upon examination of the qualitative data and the RA genre texts' structure, we realised that RA writers commonly initiate an RA with an obligatory Introduction followed by one of the following combinations: 'Methods + Results + Discussion', or 'Results + Discussion', or 'Methods + Results', or 'Results', or 'Discussion (or argument) + Conclusion'. The RA writers tend to draw upon such combinations independently of whether they are writing an RA in maths or medicine, but with few variations in nomenclature used.

The latter type, generic knowledge micro-structures, acts at the field specific level. This type of knowledge accommodates specific structural patterns, which represent the detailed experiences in specific fields.

A RA writer in that field can draw upon this type of knowledge in the process of structuring his/her RA. However, this reliance does not mean that the author will copy the specific details of that particular experience, because that particular experience in addition to others is no longer concrete; they have become abstract experiences. Rather, the writer filters his experience of new contextual variables through his existing moulded experience to produce a new RA, for example. Our conclusions lend some support to Hansen's argument (1988) that 'the rhetorical conventions of each text reflect

some of the epistemological assumptions of the dominant research model in its authors' discipline' (p.167). Such extrapolation may give explanatory hints to the generic variations across disciplines. These could be explained as deriving from schematic knowledge differences. The content of GKS is not restricted to specific components. Its content, as argued by Graesser and Clark (1985) 'includes characteristic components that often or sometimes are applicable' (p. 33).

It is worth pointing out that Brown and Yule (1983: 250) also distinguish two types of schemata according to which the background generic knowledge is organised. They are 'fixed schemata together with some other, more flexible schematic structures'. Likewise, Minsky (1975: 212) perceives the structure of knowledge of the stereotypical situation to consist of frames, each of which consists of two levels of relation. The 'top-level' of the frame represents substantial things that are specific to the situation and always there, whereas the lower level of a frame contains 'terminals' that are modelled according to the new experience encountered. The terminals represent a pool of presuppositions and expectations that can be resorted to depending on the new situation encountered.

6.1.2. RA Writers' Expressed Strategies and Practices in the Process of Writing

In the following section I will analyse some contextual forces that were reported by the respondents to constrain RA writing as a process. Some of these variables give birth to the core idea of the RA before getting things down on paper; others delineate the organisation of the researchable problem in the process of writing. In what follows, I will present the main themes of the second interview and discuss the responses of the participants concerning these themes. The content of these themes focused on: i) the processes RA writers undergo before they start getting things down on paper, ii) the particular section each RA author starts with in the process of writing, iii) the amount of RA writers' reliance on their stored mental background knowledge in the process of writing, and iv) the relationship between background knowledge accumulation and co-operative RA writing.

The findings concerning this section are expected to lay down a better ground for the pedagogical implications of genre studies.

6.1.2.1. The processes RA writers undergo before they start getting things down on paper

The aim of the questions relevant to this theme was to have a sense of the constellation of thoughts an RA writer experiences before the filtered idea is hatched, and what contextual forces affect the incubation period of the RA idea.

The responses of the participants revealed that a RA writer does not sit down and say 'Now, I want to write a research article'. Most of the researchers interviewed have never started with a particular goal in mind, as the following RA writer says:

'During the process of experimenting in the lab, I encounter a problem that I have never thought of before and that can be a subject of a new research, so I experiment on this new problem qualitatively to find out whether it is a researchable problem'.

Another respondent says:

'If you are actively working in research, you are thinking about problems. I am always thinking about problems while I am doing other things. While I am driving to work, when I go to sleep... when I get up in the morning. A researchable idea may emerge suddenly. Then I start to think of the constraint assumptions of this problem. After that I try to verify my thought on paper to find out whether the results could be proven. These processes may take years and sometimes I ignore the whole idea'.

Similarly, another RA writer mentioned that:

'During carrying out experiments to study the effects of the components of certain plants, I sometimes realise that these components have other positive effects or side effects on the subjects I am experimenting on'.

Other participants pointed out that they see strings of new ideas that connect up with things they know about. So they try to connect these strings together in an attempt to situate this new idea in the context of one's background knowledge which is based on previous experience with similar or relevant ideas. Then, they try to wrap things together and develop them.

In addition to thinking about problems, some respondents make predictions, talk to peer researchers, stir up ideas and follow them up. Here, after making rapid calculations and mathematical equations to build up a mathematical construction, one of the participants comments:

'Before I start drafting, I do a fair amount of predictions as to what findings may be obtained... I make connections and discussion of these predictions through E. mail with my supervisor and other peer researchers in the field'.

Even before getting things down on paper, RA writers think of the visual presentation of their data in order to facilitate the reader's comprehension on the one hand and to attract the attention of the audience, on the other. In other words, in order for this researchable idea to be understood by other researchers, it must be eventually presented in an unambiguous way to those who do not have the same insights as the originator RA writer. One of the participants confirmed this idea quite directly in saying:

'I play with the visual presentation of data, either using graphs, tables, etc. to find out the best way to display these data because these graphs attract attention and facilitate comprehension of the results'.

In conclusion, it is quite obvious that there are contextual forces that delineate the behaviour of the researchable idea even during the incubation stage (Rymer, 1988). It is influenced by the contextual constraints such as the nature of the topic, schematic background knowledge, and members of the discourse community who are consulted and who take a role in negotiating the idea, stirring it up after it has come into existence, or even stimulating its emergence.

6.1.2.2. Which section RA writers start with in the process of writing

The responses of the participants revealed that in the process of writing they do not follow the same procedures in sequencing the sections of their RAs. Some researchers start with the Results and Discussion section, others start with the 'Body' or 'Substance' section, whereas most of them start with the Introduction.

Participants who start with writing the Results followed by the Discussion maintained that they did so because the Results cannot be discussed, interpreted, or compared to those of other researchers unless they have already been written down. Likewise, on the basis of the Discussion section, the authors go back and write the Introduction.

In pure physics, the RA informant said that he embarks on writing the structure of the model (Body section) to make sure that it will behave properly within the constraint assumptions proposed and also to ensure that there are no gaps in the model. This is also the case in the statistics RA. The RA writer of pure physics says:

'I start writing the structure of the model I am going to work with so as to make sure that the model has no problems, whereas the last section to write is the Introduction'.

For the Methods section, some researchers write this section at the end. They said that they do not worry about this section because most of the procedures followed are stored in the mind.

Likewise, in the process of writing, the statistics RA writer starts with the Results section. He says:

‘I start with mathematical proofs to get the results because the problem is known. If I solve it, I can proceed. Then I write the Introduction. I end this section with mathematical preliminaries’.

On the other hand, most of the participants start their writing by embarking on the Introduction section because some of them consider it to be the mirror of the RA. It gives the first and most lasting impression. However, they consider this section the most difficult section to write and this in turn supports Swales (1981, 1990). One of the participants reported that he starts with the Introduction section in the process of writing, for several reasons:

‘I start with the Introduction first. I really struggle with the way I am going to organise it. I spend an agonising amount of time to get this section ready. However, I think it deserves the effort because the Introduction presents the goal setting of the problem. Thus I must think of the exact words to begin the flow of the first sentences because these sentences give the chance to the first impression to last in the mind of the reader’.

Similarly, another participant pointed out:

‘I start with the Introduction first because it represents the background to the following sections. I leave the Discussion section to the end so as to relate my findings to those of previous researchers mentioned in the Introduction’.

Our findings seem to support those of Rymer (1988) who found that the arrangement of the rhetorical sections has a functional purpose in the sense that ‘most of these sequences capitalize on certain formal components of one section to aid the invention for later sections (such as the figures and the introduction helping the writer plan the discussion)’ (p.223).

The results of the data analysis also suggest another functional purpose, which stems from the idea that the RA writers struggle to meet the demands of the members of the discourse community, such as the reviewers, by whom the product will be judged.

The responses to this issue revealed that the writers apply various strategies, in the process of sequencing their RAs, based on drafting, revising, and changing ideas. In other words, they do not draft a section in one session. They look at the components of each section in the light of the whole section and simultaneously revise each section in the light of the whole RA.

As one of the respondents says:

‘I start with the Introduction section first in order to guide me as a writer to what issues are addressed and how they will be presented. Then I go to the Results as a closing section. However, I always make a lot of drafting and revisions to sections in the process of writing to find out if there are any gaps, and to check the proofs that lead to the solution’.

Nevertheless, one of our respondents starts with an outline or a plan in the mind prior to committing things to paper but he does not stick to this plan because new ideas may emerge and this may change the course of his plans. These are the remarks of one of the subjects who is against preplanning:

‘Intelligence cannot be formalised or planned. When you have to follow delineated lines or plans, this means that you are not allowed to add, modify or change which results at the end in spoiling your intelligence’.

The above responses indicate that the Introduction section has ancillary functions to guide both the writer and the reader. These functions come to the fore especially since the word processor has come into use. For example, the Introduction helps the writer to plan. The writer starts with a plan, which is latter on susceptible to change at the end of the process. On the other hand, when the writer completes the job, s/he comes back to revise the introductory plans in such a way as to signpost the text for the reader. In the revising processes of the Introduction, the writer attempts to make the Introduction fit what actually has been written. That is because one cannot signpost things before they exist and have been written down on paper. Thus, one may argue that writing an Introduction may have a process role in guiding both the reader and the writer in the processes of writing and reading.

To conclude, these RA writers usually do not follow a model of demarcated and decontextualised stages (Rymer: 1988). They are unlike ‘the technical and scientific writers studied by such investigators as Selzer (1983), Roundy and Mair (1982), Ewing (1984), and Broadhead and Freed (1986) [who] follow a logical, linear, scientific model of composing- one with discrete stages, an emphasis on planning prior to drafting, and minimal revision’, quoted in Rymer (1988: 229).

6.1.2.3. How far RA writers rely on their background knowledge

The results of the analysis demonstrate that all the respondents rely on their accumulated experience in the process of writing. However, they vary in the amount of reliance on this stored mental knowledge. In addition, a few researchers use their

previous publications or those of others to guide them in organising the details of RA sections or particular components. Likewise, they vary in the amount of reliance on these relevant publications. The following excerpt from one of the interviews demonstrates these practices:

‘I always set and have before me my previous papers to look at their organisation and the visuals included in them. I use them as guiding and organising points during the process of writing’.

On the other hand, the following excerpt demonstrates that this participant seems to rely on his schematic knowledge of the overall organisation of the RA, but when he writes the details of each section, he consults other relevant RAs.

‘I usually refer to the mental store of my prior experience, which has been accumulated from reading hundreds of RAs. However, in writing and organising the details of each section, I sometimes consult my earlier RAs or those of others’.

For the following interviewee, he refers to his background knowledge when he writes the Introduction, Patients and Methods, and the Results sections, but when he discusses his results he makes use of other relevant RAs. He says:

‘I rely on my background knowledge in writing the Introduction, Patients and Methods, and the Results sections, whereas in writing the Discussion section I rely on relevant RAs to arrange the details of this particular section, because its structure depends on the research topic’.

On the other hand, six other participants, especially experienced ones and those who have written more than twenty RAs, maintained that they do not make use of previous publications when they come to write things down on paper. Instead, they emphasised the role of their schematic knowledge of RA writing, which has been imbibed by experience and practice. As one participant stated it:

‘I have formulated a mental picture of the organisation of the RA, after writing 50 RAs so that I depend on my previous experience... Writing a RA becomes a routine. Even when I encounter a new topic I have enough experience to deal with it and present it in an acceptable way’.

Thus a major outcome of this analysis was that it revealed how experienced writers in comparison to less experienced ones differ in composing strategies. Carter (1990: 272) points out that ‘experts become experts because they possess very highly organized schemata, developed over a long time, that are related to a specific skill’. In contrast, novices lack this specific knowledge because it is acquired from practice (Grabe &

Kaplan, 1996: 129). Expert researchers who rely on their background knowledge to write on a variety of topics in the same field seem to have mastered a varying set of linguistic and organisational responses to a varying set of topics. That kind of mastery presumably has evolved and developed by experience as a result of contact with variations of texts. This, in turn, results in forming a schematic knowledge moulded much more by experience than only by teaching structural patterns.

Based on the practices of the respondents, it seems that the more experience the RA writer has and the more he publishes, the less he refers to relevant publications and the more he relies on his background knowledge in the process of structuring his RA sections. On the other hand, the less experienced the participant is, the more he consults his previous relevant publications or those of others.

For a novice RA writer, encountering or generating a new content may result in a rhetorical problem; that is how to organise the new information in the light of the established schematic patterns. As an outlet, our analysis suggests the importance of the extensive practice of conducting research, through which novices are exposed to a variety of problems that require different procedures. These strategies may provide junior RA writers with additional frames suitable for accommodating similar or related topics. In other words, the new schematic patterns develop out of the need for novice RA writers to interact with a variety of topics, each of which is unique in its communicative purposes.

This question gives birth to the following theme, which is concerned with the practices a RA writer undergoes to acquire knowledge of genre patterns and conventions.

6.1.2.4. RA writers' background genre knowledge and co-operative writing

The question of how genre knowledge is assembled and filtered by experience is no less important for understanding writing strategies than the question of the processes that writers undergo in the process of writing a RA. Responses to this issue vary from one interviewee to another. However, most of their replies centred on the role of two issues: critical reading of RAs and co-operative writing practice.

Most of the RA writers attribute their schematic knowledge of the RA genre to the valuable experience gained by conducting work in conjunction with their colleagues. The following arguments reflect the opinions of those who are in favour of co-operative RA writing:

1. Collaborative team effort in RA writing is a tool for teaching writing as a process. In the process of writing, junior researchers have the chance to work with experienced writers who provide them with guidance in the process of drafting RAs by drawing their attention to the shortcomings or overlooked points. In this context, one respondent says: 'Each member of a team has a peculiar experience and a point of view that can help in drawing the attention of other members to their shortcomings. Needless to say that senior researchers help junior researchers by training them'.

2. Collaborative work contributes to the strength and maturity of the researched topic. Sometimes the nature of the topic investigated stipulates using a variety of techniques, the employment of which gives strength and validity to the research output. One of the participants says:

'To save time and to attack a problem from various angles, you need sometimes to employ more than one technique, each of which leads to different but complementary findings. For example to conduct a 'light and electron microscopic study', we need a collaboration between a researcher who is familiar with the procedures of the 'light' part of the research and another having the experience of the 'electron microscopic'.

3. The responses of the interviewees demonstrated that when a researcher works in collaboration with other members, s/he greatly increases the number of techniques and the actual range of points of view that are brought to bear on any problem. Given the great diversity of research areas, it is very difficult for a researcher to have knowledge of all these areas. And since findings of subject areas may have applications in other areas and many of the researchable problems arise from interaction between different parts of subject areas, it becomes more and more necessary for researchers to get together and work as a team. Researchers who have common background knowledge, but with enough variations to create something original, can work as a team so as to pool their resources to formulate a common attack on a given problem.

4. The fourth advantage of the teamwork is the critical aspect. It is helpful to work with other peers who know a little bit more than the researcher about the topic of interest. This avails the opportunity to exchange ideas with them. They may critically examine the argument and notice overlooked discrepancies in it because it is easier to find gaps in others' work than in one's own. In other words, the more one talks with different people on a certain topic, the more s/he thinks about the different parts of his/her research area, and the greater the chance one has to get fresh ideas to fill the gaps in the argument.

Furthermore, when one approaches a researchable problem single-handed, very often s/he may come to dead end, but a peer researcher alongside might draw one's attention to the next step or how to attack the problem from another angle by using a different technique.

5. Teamwork also exposes novice researchers to the conventions of the discourse community, in terms of the standard of the journal in which the RA is to be published, how the reviewers evaluate a RA, especially when it happens that a novice is working with a reviewer or an editor of a journal, as is the case with the zoology RA writer interviewed.

In conclusion, to acquire background knowledge similar to that of other experienced RA writers in the field, a novice writer should be exposed to that background knowledge that experts in the subject area have. A researcher should actually be involved in co-operative writing so as to be acquainted with the style of writing and the variety of procedures other researchers employ in attacking problems, generating content, and organising principals according to the demand of the new communicative purposes that may not have been encountered before. It seems also safe to say that the novices' abstract knowledge of various techniques will not suffice, although it can focus their attention on these techniques. The novice should actually write and read critically so as to practise and discover new styles and learn, because it is not possible to form sets of agreed upon bodies of collective procedures that one can master so as to accomplish the enterprise of RA writing. Myers (1985) reports similar findings in his study of the social construction of two biologists' grant proposals. In describing the role of training and practice in teaching an author to become a well-established writer in his field, Myers (*ibid.*) maintains that the two scientists 'learn the rhetoric of their discipline in their training as graduate students and post-docs, but they relearn it every time they get the referees' reports on an article or the pink sheets on a proposal' (p. 240). Consequently, our results show some correlation between the amount of the writers' experience and their success in RA writing.

On the other hand reading RAs critically is not sufficient to master the job unless one has a perspective on the environment of the produced texts. In essence, a contextual approach to RA writing assumes that the produced text and its context are so intertwined that they cannot be meaningfully separated. Thus novice RA writers learn to write in a subject area only when they participate in and communicate with members of

the discourse community. This broad context assists the researcher to know unfamiliar norms and constraints that lie behind the language of the produced RA texts. Jolliff & Brier (1988: 35) point out that ‘a person’s participation in the intellectual activities of an academic discipline directly affects his or her acquisition, use, and awareness of these kinds of knowledge’. They further maintain that ‘successful writers in a discipline know much more than their written products show’ (ibid: 71).

6.1.3. RA Writers’ View of Genre Text Analysis

As pointed out earlier in the Methodology Chapter, I approached the RA writers as specialist informants to check and verify the text analysis of the RAs with them. I provided each of the 16 participants with a copy of the RA analysis to read in his/her spare time after which I interviewed each of them individually. I listened to their suggestions concerning the analysis to cross-check and confirm my analysis with the specialist participants.

At the end of that particular meeting with each of the specialist participants, I asked each of them to voice his/her opinion on the text analysis I had carried out on his/her RA in terms of ‘what this analysis suggests to him/her as a RA writer’. Their opinions centred on the following issues:

1. Most of the interviewees were of the opinion that they had learnt a lot from the present RA genre analysis, to the extent that it could be used as a source of reference, especially when they write the details of each constituent section. The RA writer of theoretical physics stated the following in this concern:

‘I have learnt something of this work, because I have never thought that I follow these specific detailed steps in writing. In the future, I will spend some time browsing this analysis and compare the structure of the component steps of each section. In the future, when I write a RA I bear in mind the constituent components of each section you pinpointed. I may resort to this work as a reference; however I will not follow it step by step because the component steps of each RA section vary from one to another depending on the topic researched’.

The RA writer of chemistry expressed similar views but he went further, to the extent that he is going to use this work as a reference guide not only for himself but also for his MSc students because this work shows the function of each component in each RA section. He said:

‘I really have learnt a lot in that I started to realise how the constituents of each section are related to each other and that each constituent step has a purpose. For example, I am thinking of teaching this analysis as a reference to guide my MSc students in writing their theses, and on writing RAs because an MSc student is supposed to publish an RA out of his work’.

2. Related to the above-mentioned views is a unanimous agreement among all the participants stressing the importance of using such work for pedagogical purposes. Most of them agree on the idea that novice RA writers could be exposed to such an analysis to prepare them and help them with writing research. This can be met by drawing their attention to how the component elements of each RA section are organised and how each of these steps functions, as well as to how these overall functions express the communicative purpose of the whole RA. However, novices should be aware that this model is not the only one but it varies in accordance with the investigated topic. They further added that teaching such types of analysis might speed up the process of learning RA writing. One of the RA writers has the following to say in this regard:

‘I suggest teaching this analysis to the students as a starting point because this will help them to recognise the function of each component element in the RA. This analysis reflects my background knowledge of the organisation of the overall RA, but not of the details of each section. This knowledge has been formulated after reading hundreds of RAs and writing more than 25 RAs. However, I write a RA spontaneously. It has never come to my mind that I follow such detailed steps in the process of writing’.

In conclusion, the responses of the participants point to the importance of exposing students to models of analysis of RA genre as a starting point so as to raise their awareness of the organisation of the constituent components of an RA. This does not mean that novices should rely wholly on generic models, but there should be a kind of balance between form and process (Grabe and Kapla, 1996: 131). Learning form in this regard involves exposing learners to produced patterns.

Such patterns might form a cornerstone in the learners’ schematic knowledge that could be built on and activated when similar products are encountered for the first time. Littlefair (1991) points out that learners ‘may well achieve greater creativity if they have some idea of the form which is appropriate for their writing. Having been introduced to forms of writing, they have the tools of the trade which they can manipulate for their own purposes’ (p. 75).

However, these generic patterns should not be taught or thought of as sterile and restrictive or that they are always there in any generic text. Rather, these are better introduced as productive patterns having the facet of predictability. Nevertheless, it is difficult to decide at what degree of generality or specificity the generic patterns should be introduced and to what degree of generality a learner needs to store such patterns. To avoid sterility, these models could be introduced as part of a process. Learners would be exposed to a variety of exemplars to interact with, and they negotiate and process the organisational patterns of these examples. This procedure presumably would help novices to build on their own schematic patterns rather than learning restrictive forms. This schematic knowledge could be accommodated as they undertake the process of interactive reading and writing of various texts belonging to the same genre, as we mentioned earlier in the first two sections.

It is worth commenting on an earlier point, here. The participants indicated that they make use of their accumulated knowledge in the process of writing. However, most of them were surprised when they were given the completed draft of the move structure analysis of their RAs to voice their opinions on my analysis. As mentioned, most of the participants reported that they had never thought that they went into such detailed structured processes in the process of writing. In spite of their consciousness of their background knowledge, and their reliance on it in the process of writing, the RA writers do not know how this knowledge operates. They are also not sure how this knowledge has been assembled, or how the generic patterns are stored. What they have developed, according to their views, is a kind of knowledge of organisational responses to various communicative purposes.

Thus, we could dare to say that these participants are proficient players of the game. They try to stick to the rules of this game although they are not fully aware of the details of the rules. On the other hand, the genre analyst, as an observer, tries to make use of genre analysis as a tool to discover and put forward a descriptive set of productive rules of this game.

7. Summary of Conclusions, Implications and Recommendations

7.0. Introduction

In this study, I have examined how far generic models can be generalised across disciplines. My aim has been to carry out an RA genre text analysis in the light of Swales' model of genre analysis, and to conduct qualitative interviews with RA writers to elicit a sense of their consciousness of genre schemata in the process of writing.

The aim of this final chapter is to review what I consider the main findings of this study, and to discuss its potential pedagogical implications. I do so by exploring how the findings of this study may contribute to our understanding of genre as a category membership having a potential to operate across disciplines. However, because genres are reshaped by the idiosyncratic purposes of their register, I then discuss the usefulness of learning genre in a range of contextualised writing and reading processes.

Section 7.1 highlights the findings of the text analysis and the qualitative data investigation by addressing the research questions presented in Chapter One. Section 7.2 puts forward theoretical and practical implications that may provide pedagogical support. It offers suggestions for learning genre as a contextual process engaged with register. Finally, section 7.3 exhibits the limitations of the present study and indicates areas of further research.

7.1. Remarks on the Research

It will be remembered that the first research issue that motivated the present study is the inconsistencies and the difficulties in Swales' notion of genre. These inconsistencies can be summarised as follows. First, *genre* is defined against the notion of *register*. Swales (1981,1990) described the latter notion as outmoded and inadequate. However, since the communicative purpose is posited by Swales as a vital criterion in the identification of genre, I think that the use of functional categories to characterise the proposed generic moves articulating the overall purpose of the genre is inevitable. This is because the idea of the communicative purpose is at the heart of functional linguistics and is therefore central to Halliday's (1978) communicative notion of register, which is

associated with the communicative purpose of the text. That is to say, the communicative categories used by writers reflect the simultaneous contextual interaction of *field*, *tenor*, and *mode*. For example, the *field of discourse* refers to the speaker or the writer's purpose of communicating the topic being talked about, whether to provide information, persuade, etc. (Andersen, 1990: 8). Therefore, genre is more than the text's generic structures based on category membership. It is also driven and shaped by the communicative functions of registers when it is postulated as a cross-disciplinary construct.

Our conclusions in this regard coincide with those of Leckie-Tarry (1993: 39) who indicated that the difference between Swales' definition of genre and Halliday's definition of register 'lies less in intent than in emphasis'. However, I add, here, that Swales' view would agree with Martin's and perhaps with Halliday's himself in viewing genre as repeatable, and perhaps as a reutilization of a register, depending on the level of generality at which register is defined. There is a difficulty about how far genre can be perceived as cross registeral. It is difficult to deduce a clear view. Nevertheless, generic patterns gain a sort of variation on their journey across the boundaries of registers, due to the fact that genres are reshaped by the contextual variables of the registers. Thus, the relation between the two notions, register and genre, is complementary rather than divisive (Yunick, 1997) because both register and genre are considered and called upon in genre analysis. Therefore, it becomes clear that the distinction drawn between genre and register was based on the way the register has been analysed rather than what it really is.

Further, I hope to have shed some light on the development of the concomitant relation between genre and register by reviewing how different linguistic/socio-linguistic scholars have viewed this relation, and have pinpointed when and how this conflated relation has emerged. The confusion that has emerged as a result of the interchangeable use of genre and register has been disambiguated.

The second difficulty in Swales' notion of genre emerged when genre is used as a defining criterion of the *discourse community*. What gives birth to this difficulty is the assumption that the discourse community is defined by utilising common genres which have the power to cut across disciplines. Thus by deduction, the discourse community is dealt with as a cross-disciplinary construct. However, the evidence accumulated here does question the validity of Swales' definition of the discourse community as it is applied to the context under examination. It appears that members who are supposed to

belong to the same discourse community may not share very much in common in terms of common technical terminology, intercommunication and genre content schema.

Furthermore, I highlight the literature pertinent to the relationship between schema theory and genre. There has been a general agreement on the idea that schematic background knowledge stored in the mind takes over when a reader encounters an input related to his background knowledge. This process generally operates when readers and writers are given an opportunity to establish their own generic knowledge. However, little attention has been paid to the investigation of how far readers and writers resort to their schematic generic knowledge in the process of reading and writing.

This gives impetus to the third research question in Chapter One which calls for a study of the extent to which RA writers rely on their schematic knowledge in the process of writing and how far they have conscious knowledge of a generic model which matches that of Swales and Dudley-Evans' or even one which can be deduced from the structure of their own RA texts. The findings pertinent to this part, which are based on qualitative interviews with RA writers, complement the results of the genre text analysis in Chapter Five, in which we have examined how far Swales' genre model is consistently reflected in a corpus of 16 RAs written by these same informants selected from various disciplines. What follows summarises the major findings pertinent to these research questions.

With regard to the second research question of how far the notion of generic models can be generalised across disciplines, the corpus analysed suggests potential variations in the RA texts' generic structures across disciplines. The findings of Chapter Five clearly indicate that the structural patterns of the RAs subjected to analysis do not only vary in the number, type, order, and complexity within the same section of the different RAs but also differ in the number and type of sections contained in each RA across various disciplines. The analysis of the 16 RAs in this study reveals the following findings:

I. Move structure of the Introduction sections

A. Violations

1. As found in the analysis, the number of moves in each RA Introduction varies (e.g. the paediatrics and applied maths RA Introductions contain 6 moves, while the surgery RA has a two move Introduction).

2. Some of Swales' prescribed moves are more common than others (e.g., Move 1 is more common than Move 2)
3. We notice the absence of Move 1 from the law and electrical engineering RAs. Similarly, Move 2 is absent from the chemistry, applied maths and statistics RAs.
4. The number of Introductions closing with moves other than *Occupying the niche* is higher than that of Introductions terminating with this move. Only five out of the sixteen RAs end with this move. This in turn does not fit with Swales' claim about the sequence of these moves.
5. RA writers employ other communicative categories in addition to those put forward by Swales (1990).

B. Similarities

In spite of the violations mentioned above, there appear to be a few similarities between the RA texts analysed. They can be summarised as follows:

1. All the RAs analysed contain an Introduction section.
2. The constituent moves of the Swalesian model appear in all of the examined sections but not necessarily in the prescribed order 1- 2- 3.
3. The linguistic exponents employed by the RA writers to signal a move change or an arrival at a new move bears some resemblance to those identified by Swales. Most of these signals are lexical rather than grammatical.

II. Move Structure of the RAs' Methods Sections

In regard to Methods' rhetorical structure variations in the corpus examined, we have found that:

- 1- Methods sections for the texts of algebra, statistics, law and history RAs in the corpus examined are not obligatory.
- 2- There are marked disciplinary variations in the number, order, and type of moves included in each Methods section.
- 3- Some communicative components are more common in certain RAs than in others.
- 4- The most commonly used move is the 'Describing experimental procedures'; it appears as quasi-obligatory in the RAs including Methods sections.
- 5- A cyclical organisation is often used as a form in which moves are organised.

III. Move Structure of the RAs' Results and Discussion sections

- 1- The algebra, statistics, and chemical engineering RAs in the corpus analysed close with the Results sections; the Discussion section for these RAs is not obligatory.
- 2- The Results and Discussion sections in the corpus examined vary in the nomenclature of headings assigned to each section.
- 3- The RA writers of medical sciences apart from pharmacy employ separate sections for results and another section for the discussion of these results.
- 4- The 'Statement of finding/result' appears as quasi-obligatory move. There was no completely cross-disciplinary obligatory move in this section.
- 5- The majority of the RAs including Results or integrated Results and Discussion sections in our corpus, apart from maths, law and history RAs, displayed communicative categories similar to those proposed by Dudley-Evans (1994).
- 6- There appears to be marked variation in the types of moves included, move sequence, move structure complexity and predictability in the RAs examined.
- 7- Algebra and statistics RAs displayed anomalous type of moves, and generic move structure (e.g. RA writers tend to terminate their RAs with the 'Statement of result' as a move cycle closer, whereas this move is employed as a move cycle opener in other disciplines).
- 8- Results and Discussion sections contain procedural description moves, which are anticipated to appear in the Methods sections, according to style guide prescriptions (Day, 1994).
- 9- Half of the Results sections and most of the Discussion sections and the integrated Results and Discussion sections are arranged cyclically. This supports Hopkins and Dudley-Evans' (1988) view that the basic unit of organisation for the Discussion section is the cycle.
- 10- The length of the Results and Discussion sections, the number of experiments being reported, and the number of the research questions posited in the Introduction section appear to be responsible for the cyclical organisation of these sections.

However, these findings must be interpreted and evaluated within the context of the disciplines these RAs belong to, and the communicative purposes of the producers of the texts. Within the indicative findings based on single examples of individual disciplines, one might be tempted to think that different disciplines require different text structures. Thus, if the needs of the discipline affect the way in which the

communicative purpose is articulated, the result will be an inevitable change in the text's generic structure.

As mentioned in the Methods section, the nature of the study about genre consciousness required access not only to the RA genre texts but also to their authors. Thus, the third research question has two parts: First, how far are the RA writers interviewed conscious of genre models in the process of writing, and second, which writing practices do they employ to produce successful products?

The qualitative interview data with the RA authors discussed in Chapter 6 concerning the first part of the above question suggests potential variations in the writers' consciousness of genre structural patterns at the intersectional and intrasectional levels. The indications to be drawn from the qualitative data in this regard are as follows:

1. At the intersectional level, there are variations in the way the informants title and organise the RA sections. Informants vary in the number and type of sections into which they divide their texts. However, all agreed on the need for an obligatory Introduction followed by one or more sections including Methods and/or Results, and/or Discussion, and/or Conclusion or other equivalent nomenclatures. This option is also substantiated by an analysis of the their texts.
2. At the intrasectional level, the authors have in mind a schematic structure that bears some resemblance to the CARS model forwarded by Swales (1990). However, unsurprisingly, they showed no awareness of the technical terms Swales used to name the constituent elements of the Introduction.
3. At least half of the respondents are not conscious of the order of the generic structures prescribed by Swales' CARS model.
4. The informants think of component steps that did not appear in Swales' model (i.e. 'Indicating research methods', and 'Stating research motivation').
5. Informants in different subject areas state that they approach a research topic using different discipline and sometimes topic-specific methodologies to generate different types of results. Some of these results need only to be stated without any further interpretation, whereas the results produced in other fields need further discussion and justification to convince peers. Therefore the former type of research is terminated by the Results section, whereas the latter type of research is closed with the Discussion or the Conclusion sections.
6. The type and structure of the Methods sections that the informants think of seem to be driven by the nature of the communicative purpose of the field.

7. The major differences seem to lie in the Methods section. This finding supports Swales' (1990: 175- 76) preliminary expectations that there are more differences in the Methods section than the differences in the Introductions and the Discussion sections.
8. The informants appear to think of communicative moves that bear some similarity to those proposed in Dudley-Evans' model.

The conclusions drawn from interview data and text analysis therefore seem to support each other. It is quite obvious that the qualitative data concerning the RA schematic structure gives indicative support to those of the linguistic analysis. Both types of data reveal a sense of conformity in the way RA writers organise their Introductions. For example, the findings of the data analysis demonstrate that the schematic structure of the Introduction section is much more predictable than that of the other sections. All RA writers include the Introduction section in their RAs, and they reveal a sense of consciousness of the CARS model, but not in the prescribed order, at both levels, the linguistic and the schematic.

On the other hand, the findings reflect marked variations between the informants' schematic generic knowledge concerning the rhetorical organisation of the other RA sections. This is also supplemented by the variations between the sections found at the linguistic level. The question which arises here is why the Introduction appears in all RAs and shows a stronger sense of genre than the other sections. The answer to this may be related to the proposition that Introduction sections are partly metatextual in function, talking about what is to come and what others have said. The equivalent of an Introduction is the individuals' presentation of themselves to people they do not know. Socially, this can be a difficult interaction because the interlocutors are not aware of a common ground on which to engage each other. The meeting of a stranger requires reutilization discourse in order for people to become known to each other. An article Introduction may derive from this pattern and these facts of acquaintance.

The Introduction's main function is not to provide the reader with information about RA content and its relation to the research tradition. Rather, it contains ritualistic patterns shared by the peers. They are part of the Discourse community rituals. These patterns have been imbibed and schematised to the extent that they become ritualised as a result of their repeated use. The reutilization of the other sections is less marked because their structures must conform to the specific attributes of the topic and the

epistemology of the discipline. That is because each time the RA writer approaches the world in a rather different way to convey his purposes. Since the structural patterns are peculiar to the author's purposes, which in turn reflect the communicative functions of the RAs selected from different disciplines, this entails variations in the text's generic structural patterns manifested at both levels, the intersection and intrasection levels.

Such variations might be attributed to contextual constraints such as the nature of the subject area, the needs of writing in that area and the audience's discourse assumptions peculiar to each discipline (Hansen, 1988; Williamson, 1988; Faigley and Hansen, 1985). These contextual variables influence writing strategies which in turn result in variations in the organisational patterns of the texts. The other source of variation may be due to generic knowledge structures (GKSs) variation (Graesser and Clark, 1985) among RA writers. This type of knowledge, as indicated earlier in Chapter 6, is an abstract summary of structured knowledge (ibid.) accumulated by reading and writing many exemplar genre texts, each of which is unique in its structure and content. However, the sense of conformity evidenced in Introductions, the predictability of the appearance of certain communicative moves in the Introduction sections across disciplines and the use of certain rhetorical sections rather than others, may be explained with reference to generic knowledge macro-structure. This type of knowledge operates across disciplines, and appears in the writers' products irrespective of the discipline they read or write in. On the other hand the generic knowledge microstructure variations are related to the field specific level. However, both of these types operate simultaneously when a reader or writer approaches a particular genre text.

The second part of the third research question was what writing strategies and practices the informants deploy to produce successful RA texts. The responses indicated varied drafting processes. These practices are influenced by the demands of the Discourse community to whom it is to be delivered. Many support Swales' contention about the difficulty of the Introduction. RA writers spend an agonising time on writing the Introduction, due to its communicative function, that is, to give the busy reader the first impression about the whole text.

The results of the interview data also indicate that the informants do not follow demarcated and decontextualised stages in the process of writing based only on planning. Although a few of the RA writers actually start with an outline of the text to be presented, they do not stick to these plans in the process of writing. This is because

plans are reformulated by the nature of the meanings which unfold in the process of writing. The process of articulation allows them to reformulate their knowledge. Perhaps, this is because writing extrapolates knowledge from oneself. In the process, writers perceive their own knowledge as outsiders and start examining their ideas objectively and therefore they respond to their knowledge differently. That is to say writers may respond to what they know in a way they cannot initially predict. These differences of responses create changes in textual structure.

Another contextual constraint affecting the text's generic structure is the amount of background knowledge a writer possesses. Based on the responses of the informants, the more experience the writer has, the more s/he relies on background knowledge. Conversely, the less experience the writer has the more s/he consults the previous publications relevant to the topic to be presented. Additionally, the RA writers interviewed revealed that their generic background knowledge has been accumulated, assembled and filtered as a result of direct contact with texts throughout critical reading and co-operative writing practices. Nevertheless, the informants do not have a detailed knowledge of how these RA texts are structured and what particular detailed constituent elements are included in each section and in what order. Additionally, they have no idea how their background knowledge is assembled and have little knowledge of how it operates.

7.2. Implications

In the light of the summary of results and conclusions, it can be concluded that the present study may contribute to our understanding of the theory of genre and register on the theoretical level. On the other hand, the study has a range of possible pedagogical implications at the practical level.

7.2.1. Theoretical Suggestions

I will put forward some theoretical conclusions concerning remodelling the notion of genre that might support pedagogy. I hope that these suggestions contribute to our understanding of a supportive relation between the notions of genre and register.

In order to rescue the notion of genre, Al Ali and Holme (1999) proposed separating genre from the notion of the discourse community. However, in order not to disengage the relationship between genre and the notion of academic community, and to maintain

the power of the notion of genre and the academic community as cross-disciplinary constructs, it would be much more logical to reconsider the defining characteristics of the notion of the academic discourse community as well as the relation between genre and register. As a way out, one may suggest a model drawing mainly on the relationship between a general academic community and discipline specialised communities, on the one hand, and on the other, on their ownership of a notion of genre, drawing on the hypothesis that a text is a production of genre conventions and is fashioned by the discipline specific register needs of the sub-communities.

Swales (1990) adopts Rosch's (1975) idea of a prototypical approach to categories 'to identify the extent to which an exemplar is prototypical of a particular genre' (p. 52). The basic hypothesis of prototype theory, in Rosch *et al.*'s (1976) view, is that a *prototype* has a collection of attributes that qualify it to be the best example or member of a category. These characteristic attributes have different degrees of importance. However, none of these is considered more important or typical of the category than the others.

Swales (1990) does not put forward 'a pattern that will predict all texts in a particular genre so much as providing a prototype from which our notion of a genre derives' (Al Ali and Holme, 1999: 14). This indicates that we draw on the generic structures of a prototype to recognise whether a particular text belongs to a particular category or genre.

The reference to the prototype theory is inspired because it allows us to collect and categorise the very different examples of text structure reviewed here under the single notion of an RA. In short it permits variety in similarity. The problem is knowing the point at which this variety becomes too extreme and takes a text beyond where it could be categorised by a prototypical example. It might be helpful to follow Swales' example and look closely at prototype theory of category formation. The prototype theory seems to allow us to consider how categories exist at different levels of generality and to ask whether these levels can also be applied to text.

As pointed out earlier in Chapter Five and Chapter Six, the findings of the text analysis and those of the qualitative data analysis provided evidence that texts belonging to a particular genre vary in their structure in comparison to one another and with respect to the prototypical patterns. Furthermore, a few texts of the corpus examined can be considered as very marginal members.

There seems to be an accommodation of the inconsistencies of the move structure patterns of texts belonging to the same genre within Rosch *et al.*'s (1976) tri-levelled structure hierarchy which was introduced as an adjunct to prototype theory. The authors perceive that within a framework of a prototype approach there would be three levels of hierarchy; a superordinate level (e.g. furniture), a basic level (e.g. chair), and a specific subordinate level (kitchen chair). This adjunct theory provides levels of hierarchy for exemplar texts and provides features at each level that we may or may not map on to these texts. Such levels of prototypes allow for marginal category membership.

It seems that Swales (1990) has simplified the notion of generic models. This simplification, in fact, fails to do justice to his genius. However, Swales' (ibid.) interest in prototypes may be extended to accommodate the above-mentioned difficulties, since there is a room for this extension in the zone of the Roschian (1976) theory. The hierarchical tri-level structure provided by this theory reflects the way in which one can organise related categories operating on different levels of generality.

Here, I propose the role of hierarchy in constituting our notion of genre within the framework of the prototype approach. As is shown in the figure 7.1 below, at the superordinate level, the cognitive category of academic writing, for example, embraces members such as the RA, essay, report, etc. The similarities between these members are very small. They share only a few features among them. For example, the rhetorical structures of the members belonging to this category share obligatory Introductions, and Conclusions. They share a similar tenor, e.g. student – teacher or peer relationships. As is shown in the figure below, the superordinate prototypical features are shared by the other categories at the other two levels below.

At the lower level of the hierarchy lie the 'basic level' cognitive categories having some generic structures which are more typical and representative of the RA genre structure than the other two levels. The basic level categories command a number of attributes that would apply to most members. Thus all kinds of RAs (physics, chemistry, nursing, maths, etc.) would to certain degrees draw upon certain rhetorical structuring sections. Our data analysis revealed that members belonging to the RA genre cognitive category tend to have the following combination of attributes:

'Obligatory Introduction + Methods + Results + Discussion' or

‘Obligatory Introduction + Results + Discussion’, or
‘Obligatory Introduction + Methods + Results, or
‘Obligatory Introduction + Results, or
‘Obligatory Introduction + Discussion (or argument) + Conclusion’.

That is to say, most of the members belonging to the RA genre draw upon the components of the IMRD formats but with a few variations. Some of these structural patterns or characteristic attributes are shared with some of those categories at the superordinate level and with those of the other level below.

At the lowest level of the hierarchy, i.e. the subordinate categories, there are very specific structural patterns which represent the detailed specific attributes reflecting registers’ specificities. Thus the highest and the lowest level categories represent two extremes (i.e. generality vs. specificity). For example, our study indicates that RAs of phenomenological physics, business law, applied maths, chemical engineering data, etc., which are members of the subordinate categories, have specific rhetorical structural features. The specific examples of RA categories that I examined had specific characteristic features that are not part of the attributes of the basic level and the superordinate categories. Thus these additional features give rise to additional rhetorical structural elements that need to be learned by the apprentice writers and to be added to those features mapped from the basic categories to distinguish individual exemplar texts. This is in accordance with research in progress about an entirely new ‘move’ in geology Introductions; that is the ‘geological setting’ (Swales, personal communications, e-mail, 1999). Conversely, the problem with the superordinate category is that we cannot approach all the category members holistically. Nevertheless, if you are asked to describe this category ‘you would ‘borrow’ the gestalt properties of the superordinate category from the basic level categories involved- a first case of what will be called **parasitic categorization**’ (Ungerer and Schmid, 1996: 74). For example, Rosch’s *et al.*’s (1976) informants offer the names of the basic level categories which are members of superordinate categories. As is shown in the figure below, in the case of academic writing we will think of the basic level category, i.e. academic writing members, like, RA, essay, etc. and add a number of the shared attributes from the features characterising the cognitive basic level categories.

The Swalesian prototype was established as a detailed rhetorical structure which seems to map the features of the ‘basic level’ of hierarchy and neglect the other two levels, the super-ordinate and the sub-ordinate. Thus, the tri-level hierarchy model is needed in

order to accommodate the properties at the lowest and the highest levels. Consequently, rather than providing students with the basic level characteristics only, they are likely to be exposed to the superordinate level attributes, such as the similarities between texts belonging to the different categories constituting the superordinate prototype as well as how each type of text differs from other types. For example, learners need to be exposed to the similarities between a RA and a report or an essay, and in what way each type differs from the other types. They also need to know the specific attributes of the subordinate level, which meet the needs of the discipline specific exemplars that differentiate them from the needs of other disciplines.

From a pedagogical point of view, the specific structural attributes are a more serious problem that has been ignored in the Swalesan prototype. However, these specific attributes cannot be understood unless they are thought of as belonging to a basic level, which in turn should be situated within the cognitive context of the superordinate categories. Thus it is important to consider all the levels of generality in the process of teaching. That is because apprentice writers need a more flexible notion of prototypes that operates with different levels and allows text categories to configure register at various levels of generality, while genre is perhaps configured by all the attributes of register. They also need to avoid the assumption that genre products resemble themselves. In other words, we have to recognise that different disciplines operate with different hierarchies and that each discipline has its own hierarchical levels of prototypes.

Likewise, since it is difficult to draw clear dividing lines between members of the general academic community and also not easy to define where one sub-community starts and the other ends, it may be also more appropriate to suggest the idea of prototype and its tri-level structure hierarchy to represent the relations between individual academic sub-communities with respect to one another and their relation to the general academic community. The present position suggests that a proposed general academic community subsumes discipline specific sub-communities. Members of a sub-community share certain social values and scientific research conventions with members of other sub-communities within the general academic community. This also may find support in the more recent Swalesian (1993) view of the discourse community and (Swales, 1999: personal communication). He perceives it as best represented by

concentric circles, viewing the discipline specific community in the centre interacting with the academic community on the peripheries.

In this case the academic community members, students, teachers, instructors, researchers, etc. from different faculties share different types of genres such as, the RA, essay, report, etc. As is illustrated in the model below, faculty members of a sub-community who refer to themselves as pure maths RA writers read RA genre of algebra with great interest and also read related applied maths and statistics RAs.

Thus, we notice also how genre is configured by register at each level of generality. Members of each sub-community, pure physics or applied physics intercommunicate with peers of both of these sub-communities. The following figure presents a possible threefold relationship between i) genre and the academic discourse community and sub-communities, ii) genre and registers, and iii) academic sub-communities and the general academic community

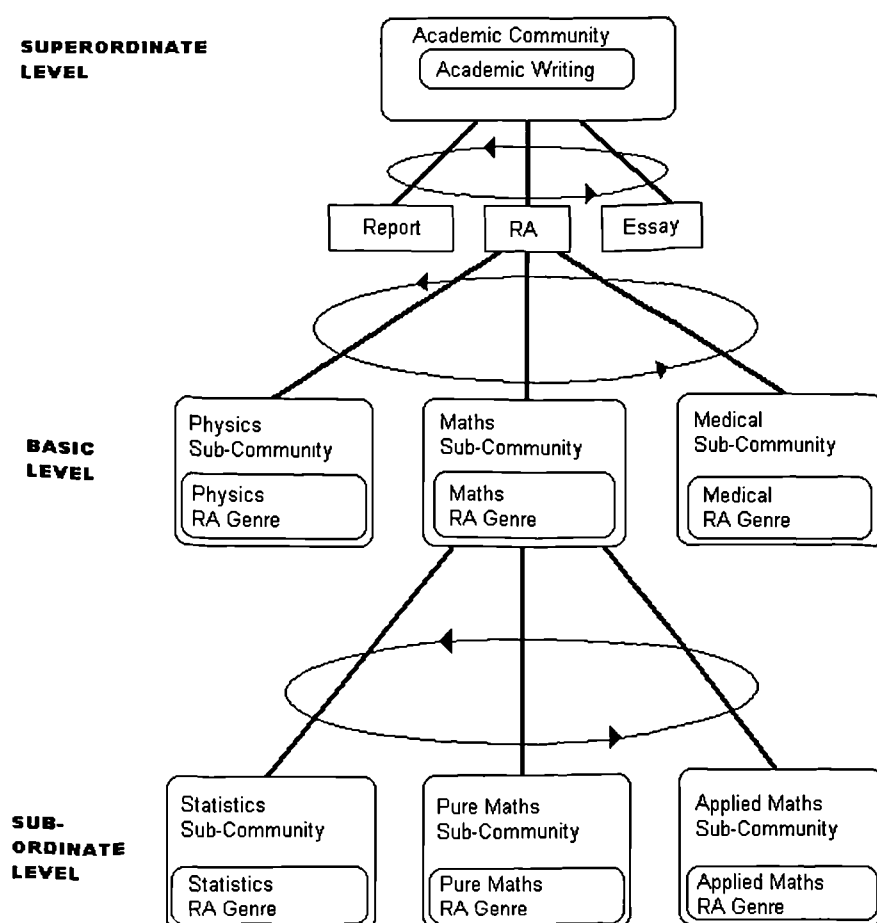


Figure 7.1 A possible threefold relationship between i) genre and the academic discourse community and sub-communities, ii) genre and registers, and iii) academic sub-communities and the general academic community

7.2.2. Pedagogical Implications

It has been argued throughout this study that texts' generic structures are affected by the needs of the disciplines they belong to. However, the RA genre has revealed schematic, contextual, repeatable, varied, and conventional features. The findings of the study suggest that in addition to looking at how a text has been constructed, students should be equipped with contextual generic knowledge resources so as to achieve a rich understanding of a text and produce successful texts. This entails that students need to have a well-established knowledge of the context. That is because the text is more than its skeletal structural patterns. Rather, these skeletal patterns are also fleshed out by the particular social and contextual needs of the register. 'To argue that induction into the genres of ones' field is primarily a matter of being taught the conventions of those genres is to argue for a reduced definition of genre and to deny its inherently social constructedness' (Dias, 1994: 195). Likewise, Coe (1994) points out that

'the reduction of communicative strategies to generic structures sometimes seems convenient for both teachers and writers. But it masks the grounding of genre in rhetorical situations... It interrupts the logical flow that should take us from considering strategies to considering the ends those strategies serve' (p. 161).

During the interviews, RA writers expressed students' need for a course in writing and reading RA genre, especially for postgraduate students. That is because most frequently the students use this type of genre as the main source to update their knowledge as researchers. To help the students achieve such a goal, we need to develop an understanding on the part of them as readers and writers that the produced texts are not autonomous isolated boxes of information. Rather they are affected by two sources. Firstly, a text is a product of social, contextual, schematic, repeatable, and conventional practices. It resembles and bears a sense of conformity in its structural patterns (i.e. formal schema) to other cross-disciplinary texts belonging to the same genre. The second is the force of *register* pulling the text towards its particular needs. Each of these forces shapes and is reshaped by one another. That is why we need to bring product and process together (Kay, 1996) as well as to teach a text as a hybrid of genre and register interaction.

In contrast to genre need analysis studies, I have had no chance to examine how the findings of my study can be implemented or utilised. Therefore this study is not in a position to verify pedagogically the suggestions offered. However, I will present a few pedagogical implications as to how the results of the present study can be exploited for

teaching generic texts out of a balanced interaction between form and process, on the one hand, and modelling and constructing a genre text out of a balance between its generic structure and the particular needs of the discipline the text belongs to, on the other. Here are some suggestions for teaching advanced undergraduates and postgraduate students wanting to use RA genre:

I. Understanding the contextual constraints of genre

Raising students' consciousness of the contextual constraints of genre production is the first step towards teaching genre. This involves providing students with sets of knowledge and expectations about what kind of disciplinary community the writer of the text belongs to, the audience addressed in terms of the amount of topical knowledge shared between the audience and the writer. Another active ingredient in a student's prior contextual knowledge is the purpose of the RA text. For example, members of a discourse community utilise an RA genre to convey their purposes and exchange expectations in connection with a new topic, continue a tradition or fill a gap in the previous literature in order to advance shared knowledge. We also need to call the students' attention to the fact that the RA genre structure is determined by its particular communicative purposes.

To help students from different disciplinary backgrounds develop hypotheses about the contextual constraints of the text, I suggest that they be exposed to disciplinary community conventions, the genres produced, and the audience for whom the text is addressed. This can be achieved by inviting RA writers from different disciplines to attend graduate students' classes and talk about the RA genre conventions, the discourse community's practices in terms of membership and genre ownership. Expert writers may talk also about their experiences, and composing practices, as well as how they process RA texts intelligently as readers. The following tasks are suggested for such classes:

1. Students read beforehand in groups a selected RA of the experienced writer. Each group has a discussion about the general rhetorical structure of the whole RA and prepares a list of questions. They may ask questions about the specific methods the writer uses to investigate a researchable topic and how s/he organises and formats the text. They may enquire about the number, status, and power of their audiences (peer researchers, referees, editors, etc.), and the kind of audience who read and pass judgements on the writers' works. They may ask questions concerning reading

strategies in terms of how writers approach reading RA texts and in what sequence, and how they deal with each section.

2. Some other senior experienced researchers who have worked as reviewers of journals could also be invited by students to talk about their published works; and how they constructed them.

3. Students invite bilingual RA writers who have publications in both languages and authors who conducted research in more than one subject area to reflect on their writing strategies. The bilingual may be invited to provide insights on the effect of cultural differences on the organisation, structuring and formatting of an RA genre in each language. Likewise, the other RA writer may talk about his organising strategies in both fields.

II. Writing out of models in a process oriented approach

A possible way of carrying out this task is to teach a text's genre structures in two parallel lines: i) constructing texts out of a balanced interaction between generic forms and process, and ii) modelling a genre text out of a balance between its generic structure and the particular needs of the discipline the text belongs to. To assist novice writers in their reading and writing tasks we may profitably start with looking at a text as a product. 'By analysing the text as product, the teacher can determine how the text was constructed - that is, consider the text as process. This knowledge can then be used to help students engage in the process of constructing their own texts, this leading to the final product' (Kay, 1995: 15). Learners also need to know that although there are often sets of RA genre structural patterns that operate in broadly similar ways in texts belonging to the same genre, these patterns may be not typical of what is really going on in the world of RA writing in various specific fields. Thus, students need to be exposed to texts' generic structures drawn from various fields in order to establish balanced background knowledge of a genre and its discipline-specific needs.

The procedure that could be followed is that the instructor and the students start by analysing an RA complete text written at a level of understanding that students can cope with. Firstly, they analyse the organisational structure of the text in terms of sections and the constituent moves of each section based on the communicative function of each section. Having determined these, the students undertake reading and writing tasks that require instantiating their experience of the knowledge of texts encountered before. This

exposure to written RA genres enables them to recognise a particular text as a RA and a particular section as an Introduction, Methods, Results or Discussion.

However, if the instructor stops at this point, i.e. providing knowledge about writing RA genre out of rigid models, his model would not be effective because 'they do not teach students to produce genres, texts that display the unique configurations of substance and organization that actual recurrent situations call for' (Jolliffe, 1988: 48). On the other hand,

'It is a mistaken view of both text and learning to imagine that one can get children to write an essay... by simply talking about it; and it is worse still to imagine that one can do this without talking about it at all. Talk prepares the way into the written mode. But it would be a mistake to think that writing something down is simply a matter of putting down graphically what you could have said phonically' (Halliday and Hasan, 1989: 69).

So far, it has become apparent that our students are in need of a model that reconciles text as a product and process. In approaching or constructing a text as a process, readers and writers are supposed to take into consideration the level of interaction between the producer and the recipient. This process oriented approach involves asking questions such as, who wrote the text, for whom, for what purpose and what is the writers intention at each stage? To do this we have to start with a product. To make this maxim more concrete I propose a kind of balance between product and process tasks that starts with instructions and ends with focusing on reading and writing activities as is indicated in the following suggested steps:

1. Instructor's assistance and negotiation.

At this stage instructors usually begin by presenting various examples of RA texts to students. The instructor might ask the students warming up questions to instantiate their schematic knowledge of the RA generic conventions. What is the typical structure of the RA? Are there different types of genre structural patterns? Drawing on their rough schematic knowledge formulated in stage I, above, students in groups, supplemented by the instructors assistance, start to draw out the significant features of each RA section: What makes an Introduction an Introduction? What elements are supposed to be included in this section? What are the constituent moves of the section under analysis and what are the communicative purposes of these constituent moves? Why are the moves sequenced in this way?

2. Students examine and negotiate genre texts (group work).

Since students have different content schematic background knowledge, the instructor tries to relate the topics of the RAs to their interests by asking the students about the kind of RA texts they would like to analyse or write. Students of each discipline form a group and bring one interesting RA sample text drawn from a journal of their area of interest for homework to be analysed and discussed in class. Groups investigate simultaneously the same section, i.e., the Introduction or the Discussion but each group looks for different RA. Drawing on their knowledge of RA genre, they apply this knowledge to the analysis and the critique of these new texts. Members of each group discuss how their results are similar or different when compared to the results of the findings from the models they have been exposed to and the structural patterns identified by students in other groups. For example, after reading the Introduction section, each group draws a skeletal representation of the moves encountered in the Introduction. In groups, students ask questions whether the new texts' generic structures encountered are similar or different from those they experienced during the previous stage. They can compare the organisation structure of the same section across the different texts under analysis. What features of the texts make them typical and how the sections are different from each other? They can look at moves that tend to occur in all the Introduction sections, and moves that have a low frequency of occurrence. Students can compare the type of sections, the constituent moves and functions of each section. Students explore reasons for the similarities and the differences behind the variations between the structural patterns of the various texts subjected to discussion and analysis. This stage is very important in that students are prepared for the fact that the generic models are flexible and subject to variation due to the particular purposes of various disciplines. Consequently, students' schematic generic knowledge is constantly open to revision in the light of the new and various models encountered.

Students recognise that in the context of what is said previously there is a place for creativity, innovation and variation. This possibility of variation indicates that generic models are not rigid and constant, but their generic structure varies according to the communicative purposes of the writers. However, variations in texts' generic structures are not drastic but the door is still half-open to the predictability of the constituent moves that tend to be included in each section across disciplines.

3. Intensive reading as a preliminary stage for writing.

Research in the teaching of reading and writing (e.g. Fillion, 1985; Smith, 1982) has tended to bring together reading and writing which were dealt with separately. The two activities play reciprocal roles in developing sensitivity to how things are written. Fillion (1985: 84) indicates that 'reading adds to the information one has to write about; writing and speaking clarify our understanding of topics so that subsequent reading about topics is easier'. Likewise, Smith (1982: 177) considers reading as writers' 'essential fundamental source of knowledge about writing'.

Thus, the implications for instructors are obvious. Students who read widely go on learning various ways of structuring their RAs depending on the type and the purpose of the proposed topic. Students should be encouraged to read RAs from various journals so as to avoid the total exposure to mono-generic models that are sometimes imposed on that particular journal. This, additionally, reinforces the idea that there is more than one way to write the Methods or the Discussion section depending on the topic being researched.

In addition, students can take different roles in the process of reading a RA. A reader can read the RA from the point of view of a reviewer or a referee, after being acquainted with the role of the referee at the first stage, mentioned above.

4. Exercises on deconstructing and rearranging written models.

Guiding reading and writing exercises could be devised, to be done in groups, along the following lines:

- A- Identifying moves and their communicative purposes at the section level in authentic and complete texts
- B- Identifying the linguistic signals of the moves identified
- C- Restructuring jumbled moves at the section level
- D- Completing a section which has had some moves omitted with the guidance of some clues
- E- Investigating the match between sections in complete RAs. This task focuses on the extent to which what was proposed or promised in the Introduction for example has been actually achieved in the Discussion section or the Conclusion or throughout the text. Students pinpoint the particular moves that realise this.
- F- Introducing variations in the use of the communicative moves to structure the same section and the variations in the linguistic or non-linguistic features to signal the

same move. Students can develop sensitivity to those RAs that do not follow the IMRD formats.

5. Drafting a full RA

Although each of the above implications and suggestions is not great in itself, a pedagogically sound picture begins to emerge. Students now move to an advanced stage where they form discipline specific co-operative writing groups that are encouraged to make use of the texts' generic structures encountered in the previous sessions. The instructor then presents the challenge of writing a RA for a journal. In the light of the above suggestions, students can make use of the above knowledge that they have established to discuss the task, remember all the steps that have been covered and face the difficulties that may arise. After that, members of each group select a topic they would like to investigate in the discipline most useful to them. They isolate and allocate the writing of the sections appropriate to a given genre and to their specific field. Their task as a group is to negotiate the structural patterns and the content of each section before they commence on the writing process. Individual students or pairs in each group select the section they would like to write. The group leader of each group collects all the sections and reads aloud the whole article to the group so that they can comment, share ideas, reformulate, modify, and propose changes for the final version of the shared genre but field specific text. Throughout the process, the instructor does not remain as a passive spectator but he tries to work as a monitor, intervening and helping students when necessary. The instructor becomes a resource that co-operative writing groups can consult face-to-face or by e-mail, especially when the task is not finished in class. The class itself is a forum where the co-operative groups are debriefed about their writing and where they can present what they have done during the week.

In the light of the present conclusions and implications, clear evidence of isolating the product and process from each other and from their significant integrated use has provided the impetus for the significant movement toward a more effective pedagogy that integrates both activities to create an active community of learners in the class.

7.3. Limitation of the Present Study; Further Research Implications

Although the current study has provided a cross-disciplinary RA genre analysis, and has revealed findings that can offer a valuable resource for implications and applications for both the RA writers and instructors of native and foreign English language, the present research is not without limitations. First, the findings concerning genre text analysis was based on 16 RA texts written by English non-native writers. This difficulty arises, here, due to the fact that any cross-disciplinary analysis focusing on an entire RA is going to be limited. Therefore, the indicative conclusions drawn here relate to the fact that the works in question display differences and divergences. Second, the verbal reports regarding the interviewees' responses to their consciousness of schematic knowledge in the process of writing have been limited to English non-native speakers who volunteered to act as specialist informants. In other words, the study is based on non-native sources in terms of texts and participants. It is possible that a genre analysis of RAs written by native speakers and an investigation of their consciousness of the schematic knowledge may not reproduce the same results obtained in this study. Another limitation is the fact that genre analysts have not agreed on a defining criteria of the notion of *move* which in turn results in adopting or creating different terminologies to label similar or analogous communicative categories especially those contained in the Methods, Results, and Discussion sections. The absence of defining criteria results sometimes in using broad generalised functional categories or over-specified ones due to the qualitative nature of this research. Furthermore, although this study puts forward theoretical suggestions and pedagogical implications for teaching reading and writing genre, the study has not offered empirical evidence to verify these theoretical and pedagogical suggestions in classroom situations.

Given the above limitations, further research could be conducted on a large sample of RAs selected from each discipline, say, physics RAs, in order to establish disciplinary prototypical discipline specific models. Such research may simultaneously consider how far the genre is controlling the differences in rhetorical organisational styles between individual disciplines. Further research projects will need to consider a comparison between RA texts written by native speakers and another set written by non-natives. For this purpose, I suggest incorporating a larger genre text analysis corpus

including a wider coverage of disciplines and a larger number of RAs selected from each subject area. What is needed also is expanding the qualitative report data to include native speaker participants. The intention will be to draw a comparison between native and non-native speakers' consciousness of schematic generic models and to investigate where their reading and composing strategies differ. Further research action may include a comparative diachronic study to trace the changes of the RA texts' generic structures across disciplines, namely between areas where research has been established (e.g. hard sciences) and humanities. Moreover, another study may investigate cross-cultural genre structural patterns. This type of research may include contrastive studies between texts belonging to the same genre written in the native and the foreign languages by the same writer. Such research can offer valuable schematic information to L2 instructors and researchers on the rhetorical pattern preferences and might motivate them to think of the reasons behind these variations.

Additionally, it might be suggested that sample genre text analysis of discipline specifics might be conducted and published. This might be appended at the end of each journal annually so those novice RA writers may resort to it as a sort of reference guide. The actual RA genre analysis needs to be based on a collaborative effort of genre analysts, and RA writers from that particular discipline and journal's editor.

Finally, our proposed theoretical model of the relationship between genre and the discourse community and the supportive relation between genre and register as well as our tentative pedagogical suggestions require further research which is rooted in actual practice.

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8. References

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9. Appendices

9.1 Appendix I. Research Articles (RAs) Examined

RA 1: Daud, A., Batieha, A., Al-Sheyyab, M., Abuekteish, F. and Hijazi, S. (1997). 'Effectiveness of iron therapy on breath-holding spells', *Journal of Pediatrics*, 17, 547-550.

RA 2: Al-Hussain, S. and Al-Jomard, R. (1996) 'Morphology of neurons in the anterior hypothalamic area and supraoptic hypothalamic nucleus of the adult human brain', *The Italian Journal of Neurological Sciences*, 17, 261-266.

RA 3: Gharaibeh, K., Ammari, F., Qasaimeh, G., Kasawneh, B., Sheyyab, M. and Rawashdeh, M. (1992). 'Pyloromyotomy through circumumbilical incision', *Journal of the Royal College of Surgeons of Edinburgh*, 37, 175- 176.

RA 4: Al-Ma'aitah, R. Rajacich, D. Khasawneh, J. (1995). 'Jordanian nursing students' interpersonal behaviors', *Health Care for Women International*, 16, 213- 220.

RA 5: Alkofahi, A. and Al- Khalil, S. (1994). 'Mutagenic and toxic activity of some Jordanian Medicinal plants', *International Journal of Pharmacognosy*, 33, pp. 61-64.

RA 6: Amr, S, Amr, Z. and Annab, H. (1994). 'Hydatidosis in Jordan: an epidemiological study of 306 cases', *Annals of Tropical Medicine and Parasitology*, 88, pp. 623- 627.

RA 7: Al-Abdallah, M. (1991). 'Chemical and electrochemical behaviour of titanium in methanol- water- HCL mixtures', *British Corrosion Journal*, 26, 133- 134.

RA 8: Rinker, E., Russell, J., Tamimi, A. and Sandall, O. (1995). 'Diffusivity of nitrous oxide in *N*-Methyldiethanolamine + diethanolamine + water', *Journal of the Chemical Engineering Data*, 40, 630-631.

RA 9: Elabdalla, A. and Abu-El-Haija, A. (1988). 'Personal computer flexible multichannel interface for data acquisition of low-frequency signals', *IEEE Transactions on Instrumentation and Measurement*, 37, 510- 514.

RA 10: Shariah, A. and Lof, G. (1996). 'The optimization of tank-volume-to-collector-area ratio for a thermosyphon solar water heater', *Renewable Energy*, 7, 289-300.

RA 11: Carlson, D., Malkawi, E. and Yuan, C. (1994). 'Probing the couplings of the top quark to gauge bosons', *Physics Letters B*, 337, 145- 151.

RA 12: Nusayr, A. (1980). 'Propagation of waves in rectangular ducts with sinusoidal undulations', *Journal of the Acoustical Society of America*, 67, 1472-1476.

RA 13: AL-Eideh, B. (1995) 'Extinction time of a diffusion model and catastrophe process', *Modelling, Measurement and Control*, 12, 27-32.

RA 14: Mohamed, M. (1997). 'A note on BOL algebra operators', *Far East Journal of Mathematical Sciences*, 5, 651- 656.

RA 15: Algudah, F. (1992). 'Central bank liability to depositors', *The Journal of Business Law*, 481-489.

RA 16: Duri, A. (1979). 'Landlord and peasant in early Islam', *Der Islam*, 56, 97- 105.

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9.2 Appendix II. A Semi-structured Interview

The purpose of this semi-structured interview is to probe English research writers' consciousness of RA texts' generic structure. The questions of the first section aim to investigate the purpose and the constituent elements or moves of each RA section; and the various options adopted by the writers to construct the organisational divisions of a research article. The questions in section 2 centre on the writing strategies the RA writers adopt in order to produce successful RAs.

Section One

1. How many published research articles have you had?
2. What is the language of the journals in which your articles have been published?
3. Do the journals in which you publish your articles have a special section called "Instructions to Authors"? If yes. Are these instructions relatable to the organisation of RA sections or to what?
4. Do your articles follow a standardised model or a certain section structure? If yes. Can you tell me, in sequence, what are these conventions?
5. Have you got any article published without following these conventions? Is a rejection of an article related more to the way you write the article or to what you write about?
6. How do you organise the Introduction section of the RA, i.e. what is the first thing you write about?
7. How do you organise the Methods sections? What components do you include in this section?
8. Do you present your results, discussion and conclusions in three separate sections or integrate them under an encompassing title?
9. How do you organise each of these sections when they are presented separately?

Section Two

1. How does a researchable idea generally emerge?
2. Would you describe the processes the idea undergoes before you get this idea written down on paper?
3. Concerning the sequence of the organisational sections of the research article, in the process of writing, some researchers write the Introduction after they finish the other sections, others start writing the Discussion section first and then move to other sections. What sequence do you usually adopt and why?
4. Which section do you start with first and why?
5. To what extent do you rely on your experience or your background knowledge of RA writing in the process of writing?
6. Do you use previous related publications to guide you when you start writing any RA section? How much do you rely on these publications?
7. Do you side with those who construct an outline of the RA based on planning before they start writing or with those who want to get something down on paper and then start revising and editing?
8. How did you acquire the conventions of research article's writing? Were you taught how to organise a RA?
9. Do you prefer to approach a researchable problem as a single RA author? Do you encourage collaborative team effort? Why?

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