CHAPTER 3

REVIEW OF LITERATURE ON ACADEMIC TEXTS

3.1 Introduction

The literature that explores academic texts and the research article in particular is quite extensive and has been carried out in both the United States and the United Kingdom in the last three decades. However, there are variations in the types of analysis used and in the selection of data, which may sometimes be whole articles and sometimes sections of articles.

3.2 The grammatical-rhetorical approach

There has been extensive work on identifying the characteristics of scientific and technical English. The characterization of scientific discourse in terms of a rhetorical framework was developed by Lackstrom, Selinker, Trimble and others. This approach of looking at academic texts arose out of a response to the usual complaint that the American approaches to the teaching of English as a second language was sentence-oriented

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and lacked important relationships to usage and content. Lackstrom et. al. (1972) studied elements that went beyond a single sentence and attempted to show that the grammatical choices made in a text could not be taught without referring to the rhetorical considerations and subject matter. They stated that the choice of tense in technical articles was not based on time as had traditionally been taught but on the notion of generality.

This approach to academic writing was adopted and extended by several others who examined verbs, tense and the passive and related them to rhetorical considerations. Ramsay (1980) discovered that some grammatical structures were more efficient than others in communicating scientific facts. His study revealed that the passive which had always been considered the norm in technical writing could be disadvantageous from a communication standpoint. The use of the passive was also investigated by Tarone et. al (1981) who examined their occurrence with that of the active form in journal papers in astrophysics. They observed the rhetorical functions of these two forms and discovered that these determined whether the active or passive was used. Wingard (1981) analyzed medical texts for different types of verb constructions.

Swales' study on the occurrence of -en and -ed participles is determined by the purpose and function of the text and its components, and that the deci-

sion to include a participle or omit it is affected by the writer's rhetorical decisions.

The above studies examined whole texts and how rhetorical decisions determine grammatical structures. It is a useful approach which is suitable for the teaching of English for specific purposes and allows material designers to focus on the structures that are considered important for students to express what they wish to express in a suitable way. However, there is no mention of the discourse structures in these studies and these studies have generally been of a non-statistical nature.

Discourse structures were examined by Lackstrom (1981) when he gave a characterization of the internal structures of two discourse structures found in English for Science and Technology, and how they related to each other. The discussion problem is usually found in course examinations and at the end of chapters in introductory textbooks. According to Lackstrom, the answer to the discussion problem is in the form of a logical argument. The discourse structure of the discussion problem and response are given as follows:

DISCUSSION PROBLEM

A. presentation of the relevant facts

B. statement of the problem/question

LOGICAL ARGUMENT

A. statement of applicability (of the governing principle to the relevant facts)

B. governing principle

C. statement of applicability (of the relevant facts to the governing principle)

D. conclusion

(Selinker et. al., 1981:21)

This study is an attempt to look at a broader range of discourse types than those which have been examined earlier on grammatical structures, definitions and descriptions of apparatus.

The use of rhetorical structures to define genre was discussed in Wood (1982) who attempted to integrate two distinct approaches to scientific texts, the functional division of a text and the realization of the function in linguistic form. Wood felt that what was needed was a more detailed research on specific types of texts `to pin down the concept of rhetorical function more exactly' (Wood, 1982:121). Ten Chemistry articles were examined to determine whether there was a consistent rhetorical structure. The following structures of Chemistry articles were given by Wood:

Rhetorical structure

1. Title

2. Author

3. (Summary)

4. Background of previous work

5. Nature of present experiment

6. Experimental

7. Results

8. References

Linguistic rhetorical structure

1. x quantity of chemical 1 be

   (mixed with / dissolved in) y quantity of chemical 2

   (Mixture 1) be prepared

2. (Solution 1 / x quantity of chemical 1) be placed in apparatus 1

3. Apparatus 1 be (fitted with / equipped with / connected to) apparatus n

4. z quantity of chemical 3 be added to solution 1

5. (Solution / Mixture / Apparatus) be (warmed / heated / cooled) ((for p hours) at q) (in apparatus) (with chemical)

6. Yield is quantity k percentage 1

(Wood, 1982:127-131)

Wood claimed that if a scientific text, in this case a Chemistry text, had this structure, then it was scientific. He hypothesized that a similar model in terms of rhetorical and linguistic rhetorical structure may exist for other text types. Woods' rhetorical structure is similar to the sectional divisions of the articles in this study. However, his linguistic rhetorical structure is rather rigid a model to be applicable to many articles even in the same field. What he does not have is an intermediate level of analysis, that equivalent of the `move', and which lies between the rhetorical structure and the linguistic rhetorical structure.

Studies on grammatical structures and the different sections in an article have been carried out both in the United States and the United Kingdom. West (1980) examined the relationship between nominalization occurrence and scientific rhetorical divisions. Each section was looked at individually; the introductions, methods, results and discussion, and the that-nominal constructions in each section were analyzed. The study revealed that the introductions had more that-nominal constructions than the results section, the introduction section had approximately the same number of that-nomi-

nal constructions as the discussion section, and that the methods section had fewer that-nominal constructions than any of the other sections. This difference in frequency is related to the different rhetorical sections. West's explanation was that `because that-nominalizations relegates statements to secondary positions in other statements, that-nominals are used when making claims about other statements rather than simply making statements' (West, 1980:486-487). He added that the high density of that-nominals in the introduction section was due to the fact that one of the main findings of the introduction is to make claims about other research. Likewise, he found that the discussion section made claims about research findings and contained many that-nominals.

Further support for the conclusion that different sections of an article perform different rhetorical functions which require different linguistic resources to realize those functions is found in Adams Smith's (1984) article. The writer investigated `author's comment' in six medical research papers, examining clinical case notes or short reports, research papers and editorials. For clinical case notes virtually no author comment was observed except in the final section. In research papers, it was found mainly in the introduction and discussion, and in editorials attitudinal marking was found throughout.

Finite verbs in the different sections of theses have been examined by Hanania and Akhtar (1985). The finite verbs in each section was analyzed with respect to voice, tense, aspect and modality. Like Ramsey (1980) and Tarone et al. (1981), they found that active verbs exceeded passives and that the active verbs appeared mostly in the simple present tense. Hanania and Akhtar found that significant differences emerged when they examined the rhetorical divisions of their corpus.

Such work has focussed attention on the identification of specific lexical, syntactic and rhetorical characteristics of EST texts that may contribute to defining the genre itself.

3.3 Swales' moves analysis

Swales (1981) developed an approach to the understanding of academic discourse, applicable to practical situations, involving a system of analysis that is able to reveal something of the patterns of organization of a genre. An analysis of this type would enable language experts to find out the nature of a genre that will be useful in ESP writing and teaching. He has focussed mainly on the study of introductions in academic articles and examines them in terms of the `moves' which are present in the section. His first model for article introductions was found to be inadequate by several analysts and as a result a second model

for article introductions was developed. This has been described in Chapter 2.

Following Swales, a number of scholars have analyzed written texts by using his moves analysis and have come up with useful models for academic articles. Peng (1987) attempted to apply Swales' modified three-move model to the introduction sections of ten chemical engineering research articles and to develop a similar model for the discussion sections. His findings revealed that the introduction sections invariably included all three of Swales' moves and generally in the order of moves 1-2-3.

A ten-move system was set up for the analysis of the discussion sections. They are as follows:

0. Information move
1. Statement of results
2. Observation
3. Comparison
4. Expected outcome
5. Explanation
6. Deduction
7. Hypothesis
8. Justification
9. Validation
10. Recommendation

(Dudley-Evans, 1987:88-89)

Many ESP writing teachers find this section to be the most difficult for students to write so this analysis is a useful one in the development of a model for the discussion section. The discussion sections examined by Peng were found to consist of several cycles of moves which were of two types: `a cycle at a higher level answering a research question...or at a lower level, a cycle that deals with each separate step in the author's argument such as a positive evaluation of previous/established results...' (Dudley-Evans, 1987:94).

Besides the introductions and discussions, research has also been carried out on the results section. Thompson (1993) who examined this section in the field of biochemistry identified six rhetorical moves, and demonstrated that the results sections which she examined did not simply report facts as was commonly believed, but that a number of rhetorical moves were employed by the writers who argued for the validity of their experimental findings.

In another research on article introductions, Swales and Najjar (1987) carried out a study of the announcement of principle findings (APFs) in two contrasting fields, physical science and psychology to supplement an unpublished investigation by Kinay, Muloshi, Musakabantu and Swales (1983). Kinay et. al. had found that out of fifty introductions examined, forty-five had clear move 4 (Swales' 1981 model) promissory

statements. Of the forty-five, only ten had APFs. Swales and Najjar examined 110 article introductions from articles which had abstracts and found that half of the physicists mentioned principal findings in the introduction while virtually none of the psychologists did so. Swales concluded this to be related to the discourse community in which they belonged.

Adams Smith (1987) looked at the differences between medical articles published in a journal and articles on medicine published in less specialist journals and concluded that the rhetorical acts are more important than surface features in forming coherent discourse.

Efforts such as the above appear to have neglected the language found in research articles and have focussed mainly on the discourse structures and organization of articles. While useful in the teaching of discourse structures of articles to ESP students, analyses of the language present in all the moves would also be of much benefit.

3.4 The Systemic analysis

A number of different papers have attempted to define the generic properties of texts from within a systemic-functional perspective and several types of representation have been proposed as ways of represent-

ing the structure of academic writing.

Drury (1991) examined students' summaries at university level of the same journal using the framework of systemic linguistics. She began at the macrolevel with the description of the influence of culture and situation in the summaries and the source texts, followed by an anlysis of their schematic structures. This in turn provided a background for further analysis at the microlevel (theme, transitivity, grammatical metaphor).

The writer relied on Martin's (1984:25) work on genre in the discussion of the influence of culture and situation and the schematic structure of the summaries. Halliday's (1985) work and the work on grammatical metaphor by Eggins, Martin and Wignell (1987) were applied in the discussion at the microlevel.

The systemic-functional framework was also used by Ventola and Mauranen (1991) in their study of academic articles written by Finnish researchers and revised by native speakers. They focussed on global text organization and linguistic devices like connectors, thematic patterns and reference. This study assumed in accordance with a semiotic approach to genre (Martin, 1984; Ventola, 1987) `that the global generic structures constrain the combinational variable realizations of register, which in turn determine discourse and other linguistic structures in texts' (Ventola (ed), 1991:462). The discourse systems which were investigated

were connector use, thematic development and reference. How these systems were employed and how the writers were able to build up cohesion in global structures were studied. Some aspects of Swales' genre analysis through moves were adopted as well.

A comparison of genres has also been carried out by some. Following Halliday, Francis and Kramer-Dahl (1991) explored how the lexicogrammatical patterns of both case reports and case stories realize the metafunctional options available on the semantic level, and how these, in turn, realize the options available in the larger context of culture. The generic structure of the texts was found to determine the language used.

Fahnestock (1986) who did a comparative study of scientific research reports and their popularized versions demonstrated that the different audience to whom the texts were directed to resulted in different use of language.

Smith (1985) examined the features which make up the interpersonal component in scientific texts such as grammatical person, prepositional groups and mood and modality and found that with respect to certain features associated with the presence of the writer, the least specialized text emerged as the most interactive while the most specialized text emerged as the least interactive. This finding, like that of Fahnestock's (1986) and Adams Smith's (1987), corroborates the notion that the

specialization level of the intended audience is a significant variable in determining text structure.

Work showing how written texts reveal situational conditions and constrain readers' possible interpretations have been carried out. Brandt (1986) analyzed the structure of three texts composed by the same student writer and showed how the exophoric references, cohesive devices, and thematic structure reveal the social contexts in which each of them were produced. `We' and theme were examined by Petinnari (1985) who claimed that for a complete understanding of the grammatical choice of we-sentences, the thematic information was linked to the wider situation of the hospital environment and deduced that in writing a surgical report,it is necessary to know the context, and potential audiences, in particular, to choose the grammatical structure which realizes the discourse function. Eiler (1986) proposed a method of textual analysis that enables genre identification in her analysis of thematic structure of written texts by referring to the work on thematic structure by Halliday and other linguists.

These works enable the functions of written communication to be understood and are useful not only to those involved in the teaching of ESP and EAP, but also to writers and readers.

3.5 Concluding remarks

The above review attempts to provide a brief look at the different approaches that have been used in the analysis of academic writing. Some have attempted to describe scientific or medical writing in general while others have focussed on discourse structures and linguistic features. Several others have discussed the sections found in articles and some tentative models have been proposed.