CHAPTER ONE

INTRODUCTION

1.0 Introduction

Chapter one begins with an overview of the study in terms of the statement of the research area. It puts forward the purpose of the study and the main lines of inquiry that guide its development. The chapter also illustrates the significance of the study and the reasons for undertaking the study. The constraints within which the study is to be carried out is also discussed.

1.1 Statement of the research area

This research is associated with content analysis of chemistry texts. It investigates whether lexical items display cohesion in chemistry texts. Semantic interpretations of the lexical items can be captured syntagmatically and paradigmatically in system networks that demonstrate the cohesive nature of the texts in lexical patterning. The relationships between items from sources of lexical cohesion will be established using the framework of reference by Halliday (1985) and Martin (1981, 1989 & 1992). Halliday and Martin's framework of the forms of lexical cohesion reflects taxonomic and collocation relations

of texts. Its application is established as an analytical tool in investigating texts in varieties of genre of which chemistry is one. This research is based on the assumption that a conceptual representation of lexically-related items in the text can be captured in system networks in systemic tradition by explicating syntagmatic and paradigmatic relations (Halliday & Martin (1981), Halliday & Fawcett (1987), Martin (1981,1987, 1989 & 1992), Fawcett (1988) and Hasan (1987)).

The stretches of texts that will be examined for their cohesive properties are identified with topics such as Atoms and The Atomic Theory and Gases. These chapters are extracts from two general chemistry textbooks which are available in the main library of the University of Malaya whose readership includes university students and lecturers. The language studied is characteristic of chemistry discourse written in English.

1.2 Purpose of the study

The aim of the study is three-fold. First the text is approached from a Halliday and Hasan (1976), Halliday (1985) and Martin (1981, 1989 & 1992) linguistic model. The model identifies lexical items that form strings of cohesive links with one another which are grouped according to their semantic fields. The second aim is to show how

cohesion is achieved by establishing meaning relations between a lexical item and another in the text which is essential for the interpretation of its meaning. When a lexical item depends retrospectively or prospectively on another for the recovery of its meaning, a cohesive tie is said to have been formed between the two lexical items. A lexical string is constructed of two or more lexical items in cohesive relations with each other.

Being a graduate of chemistry, I find the text coherent and the use of a dictionary and encyclopedia of chemistry terms is deemed essential to ascertain definitions of lexical items. Both the formal and contextual meanings are sought. The formal meaning is solicited to substantiate the contextual meaning inferred from the text. These text-bound lexical items are given taxonomic labels which identify the establishment of cohesive relations. The taxonomic labels of hyponymy, cohyponymy, repetition, synonymy, antonymy, meronymy and comeronymy are used to identify the cohesive relations. The results of this lexical study are used to accomplish the third aim and that is to determine which lexical items may act as entry conditions for the inclusion of features in a semantic system network. This is to represent cohesively-related lexical items as choices or options which systemically relate to other choices or options.

1.3 Major research questions

First I would like to find out whether a general explication of the text will enable me to identify lexical items as ties in different semantic or lexical fields. Following a more detailed study, I would like to see the successful application of Halliday and Martin's work on lexical cohesion in labelling the semantic relations underlying the lexical items. The lexical items that do not associate with the existing labels may need to be subsumed under new ones. Next, I would especially be interested to know how I would resolve the ambiguity of the labelling convention when there is more than one possible interpretation of the kind of cohesive relation formed. I would like to find out what criteria I would use to guide me in order to be consistent throughout the analysis. Another closely related area in question would be what criteria I would use to label a semantic relation in the absence of overtly displayed cohesive signals. I would also like to know the criteria upon which I would base my selection of lexical items in order to determine the entry conditions, features and options in the system network. Finally, I would like to know whether the integration of several such networks can conceptualise a topic within a stretch of text examined. More precisely, this research could answer questions on the degree of delicacy and choice in system networks.

1.4 Significance of the study

This research may have pedagogic applications in the field of English for Specific Purposes (ESP). The scientific texts usually appear enormously difficult in terms of their analyses and interpretations to new learners of an academic discipline, to learners for whom English is a second language and to those who have only had limited exposure to scientific texts written in English. The texts seem laden with both unfamiliar vocabulary or discipline-specific registers and unfamiliar semantic organisation. An analysis of cohesion by the ESP teacher and learner may help the learner to build a more effective reading strategy and writing strategy. Learners are made more aware of how a text stays on topic, does not digress, preserves unity and organises lexis.

Another application of the study is the possibility of representing the content of chemistry in a system network. My review of related literature shows that ESP teachers or subject specialists are already using intricately interwined concept maps and sequenced elements in flow charts to help students visualise graphically, ideas and principles in scientific discourse. (Love 1991 ; Pendley et.al. 1994).

What is proposed in this study is the possibility of representing the content of chemistry in a system network. A system network representation of the content of chemistry differs from the above

classificatory mechanisms in two important ways. The first is in the manner of presentation. The network represents the concepts in a simultaneous and hierarchical order using the notations of curly brackets denoting simultaneity and square brackets denoting alternatives. The second is in the emphasis. The network operates on the fulfillment of conditions, the motivation of features and the realisation of options. A system network consists of a system and an entry condition in which once an entry condition is fulfilled one of the terms in the system must be chosen. Figure 1.4.I illustrates the above description.

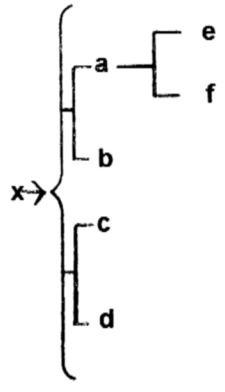

Fig. 1.4.I

The entry condition **x** motivates the two simultaneous systems **a/b** and **c/d**. If **x** is fulfilled as entry condition either **a** or **b** and either **c** or **d** is motivated. The feature **a** further acts as entry condition to foreclose the options **e** or **f**. The features **a/b** and the options **e/f** are hierarchically ordered systems of the network. The ESP teacher

working closely with a subject specialist may construct system networks based on lexical items which display cohesion and this may in turn assist the learner to conceptualise a topic and learn more meaningfully.

Another application of a lexical study would be in the domain of text analysis of academic and professional disciplines. Much research has concerned itself with register analysis, rhetorical structures and patterns of lexis. Lexical cohesion and system networks may have useful insights in the compilation of a collocational thesaurus for chemistry.

1.5 Rationale of the study

The subject of cohesion has been under much scrutiny and has received much awareness ever since the pioneering work of Halliday and Hasan (1976) in "Cohesion in English." Since no apparent studies have been done in analysing chemistry texts in terms of their cohesive properties achieved through the selection of vocabulary and conceptualisation of meanings in system networks, I am convinced that this research is indeed worth its while in exploring such texts and discovering the meaning relations underlying their patterning. Moreover it is the textbook that an undergraduate relies on in order to make references on chemistry phenomena and to make notes to

supplement lecture notes. An investigation into systemic-semantic relations may reveal some information on how lexis is organised in chemistry.

1.6 Limitations of the study

A lot of research on corpus-based linguistics has been concerned with the processing of long stretches of texts in order to be recognised as having statistically significant findings. Some research has been done using software to analyse collocations of whole texts. The study I am undertaking is done manually and is thus limited to only two chapters of introductory and general chemistry textbooks at the university level. The extent to which the patterns of organisation discovered, is a characteristic of all introductory and general chemistry textbooks, may not be fully determined. A more sophisticated analytical technique that will permit the handling of large stretches of text will be needed. A further line of investigation could be on the preferences of a particular lexical item over another to express meaning in chemistry. A comparative study would help establish consistency of terminology and comprehensiveness of average. Some features in the system networks may have to be left unexpressed and be represented by the empty set symbol, ∅. Since the system networks are based on the content of the chemistry texts under study

and not on the whole of chemistry knowledge, an analysis of several texts of the same topic in different textbooks may help provide the features currently represented by the empty set symbol. It would also be interesting to know the role of coherence in analysing cohesion in chemistry texts that is whether a significant proportion of cohesive devices makes a text appear more coherent to its intended audience. Another area of inquiry would be to what extent the taxonomic distance between one lexical item and another in the text influences its ability to exert cohesion in the text. This would be a comparison of the cohesive force between more densely populated lexical strings and more sparsely populated ones.

1.7 Conclusion

This brief introductory chapter has highlighted some background information concerning the research area and will be used as a forerunner for the rest of the chapters which delve more deeply into the concept of lexical cohesion, particularly how it manifests in chemistry texts.