



PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

AMAR TELIDJI UNIVERSITY – LAGHOUAT

FACULTY OF LETTERS AND LANGUAGES

DEPARTMENT OF ENGLISH

An Analysis of ESP Students' Reading Strategies: the Case of 3rd Year LMD Nature and Life Sciences

Memoir submitted as partial fulfillment for the requirements of Magister degree in
English for Specific Purposes (ESP)

Candidate:

CHENINI nacira

Board of Examiners:

Chairman: Dr. M. Afkir

University of Laghouat

Supervisor: Dr. F. Kaid. Berrahal

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Examiner: Dr. N. Guerroudj

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Dedication

To my parents,

With love, esteem, and gratitude

To my sisters

To all those who help and encourage me.

Acknowledgements

I would like to thank all those who, through their intellectual, administrative and moral support, contributed to the accomplishment of this degree.

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I would also like to thank all the students who participated in the study.

Abstract

The current study investigates the reading strategies used by NLS students to solve the reading problems. It aims at analysing the most applied strategies to diagnose the language abilities and gaps. It is designed to get insights about NLS students' reading abilities and difficulties. Such an analysis can explain the extent to which ESP apply reading strategies while reading specialised texts.

The design of the current study is threefold. The first chapter deals with theoretical aspects related to ESP, reading, and reading strategies. The second chapter contextualise the research into its context. It explains the methodology and the research procedures used. Data are collected through teachers' interview and students' questionnaire. Findings and data analysis are presented in chapter three. The results are described and analysed qualitatively and quantitatively. NLS students apply reading strategies to solve the reading deficiencies. They rely mostly on content schema knowledge and translation in comparison with linguistic schema abilities. The use of reading strategies is determined specially by reading purposes and reading difficulties.

List of Abbreviations

- **EAP:** English for Academic Purposes
- **EBE:** English for Business and Economy
- **EFL:** English as a Foreign Language
- **ELT:** English Language Teaching
- **ESS :** English for Social Studies
- **ESP:** English for Specific Purposes
- **EST:** English for Science and Technology
- **NLS:** Nature and Life Sciences
- **TALO:** Text as Linguistic Object
- **TAVI:** Text as Vehicle for Information

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General Introduction

General Introduction

The general framework of the current study is the reading strategies that ‘English for Specific Purposes’ (henceforth ESP) students use when reading English texts. Reading specialised texts requires more knowledge of subject discipline (content schemata) in addition to language knowledge (formal schemata). Thus, reading in content areas is mostly related to subject discipline texts in which students need to learn information and acquire knowledge to fulfil some special tasks.

Due to the recent theories in the field of language teaching basically named ‘needs analysis’ and ‘genre analysis’, the approach ‘English for Specific Purposes’ has found its place. The latter is based on the two aspects: the ‘learners’ needs’ and ‘genre analysis’ that is related to the study of the linguistic behaviour in institutionalised academic and professional settings i.e. the study of specialised texts. In this respect, ESP is seen as an approach to language teaching in which all decisions as content and method are based on the learner’s reasons, needs, and wants of learning (Hutchinson & Waters 1987). So, students need to develop the appropriate knowledge about formal schemata, content schemata, and the discourse of their subject discipline.

The current research examines the way ESP is taught. It highlights the students’ learning situation and the factors that can facilitate their English learning. Moreover, the choice of reading is not haphazard, but it is dictated by the need of ESP students to read and understand content areas English texts due to insufficient documentation and resources in the language of instruction ‘French’. Students need to read scientific texts since they are students of ‘Nature and Life Sciences’ (henceforth NLS) particularly that English is the language of science and research. Many scientific articles are published in the aforementioned language.

English is learnt for specific purposes. It means it is a driver for the transmission of the disciplinary knowledge. In this connection, reading is set for specific academic purposes since students deal with texts related to their subject matter. It is considered as a tool to glean information and data on the basis of the student’s purpose and context particularly that the main aim of reading is ‘reading for learning’. Such an

aspect is somehow related to the approach of ‘Text As a Vehicle of Information’ (TAVI) (Johns & Davies, 1983).

Learning ESP means that students are required to have language abilities and skills in order to deal with knowledge transmitted in English. In other words, they need the appropriate knowledge related to their subject discipline: vocabulary, syntax, discourse, and genre. Mastering the language command makes students able to read and understand texts which they need in their academic careers and even for occupational services.

The research work aims to depict and analyse the situation of students in content areas as it is the case of the chosen population ‘NLS’. These students are required to read and understand texts planned and selected by the teacher on the basis of the course topic in the absence of well established syllabus. The texts are taken from the book ‘General Science’ (series book general science part (1) and general science part (2) are designed as textbooks), in addition to other extra-texts from web sites and science encyclopedias. Moreover, NLS students are in the final year (third year LMD). Thus, they are required to consult, read, understand, take notes, and summarise information which they need in order to carry out their research projects, specially with the explosion of English scientific resources and documentation. Therefore, it is crucial for ESP students to reinforce their reading skill to achieve and access knowledge written in English. As experiences and statistics show, ESP students face reading difficulties particularly at the level of morphosyntax (the lack of linguistic knowledge). Such a deficiency causes some reading failure. At this stage, students should develop their reading strategies and techniques for the sake of communicating with the text and to get their aims and purposes of reading.

Although ‘Nature and Life Sciences’ students are familiar with the content of the subject discipline, they still face reading difficulties. Such reading deficiencies push NLS students to rely on some techniques and ways to compensate for the reading gaps and problems on the basis of the context and the purpose of reading. These techniques are academically known as ‘reading strategies’ and their nature is still a subject of controversy and debate (learning styles, tactics, cognitive abilities, etc). Reading strategies are considered as ways and techniques that students bring to the text to understand and construct comprehension when reading gaps and problems are

encountered (Carrell 1989, 1998). The awareness and the use of such reading strategies differ from one student to another. This is based on reading motivation, attitudes, language knowledge and understanding of the discipline, reading abilities, and difficulties. The texts designed for reading are scientific in which the discourse is based on special textual and non-textual criteria.

The following study sets to scrutinise the reading strategies which ESP students apply to compensate for the reading difficulties and meet the reading purposes. It seeks also to form an analysis about the most applied reading strategies in order to describe, study, and analyse the reasons behind such application. Having such a kind of analysis helps to diagnose the reading abilities and at the same time the reading deficiencies. At this level, teachers can work out and design activities which can improve reading efficiency. The research idea came from the fact that NLS students need to access to knowledge transmitted in English. This knowledge is required to perform some pedagogical tasks particularly that the current theories of ‘teaching and learning’ focus on notions like ‘learner centered’ and ‘learner autonomy’. Moreover, the research deals with the way NLS students manage their interaction with texts. In particular, it attempts to investigate whether there is any relationship between the most frequently used reading strategies and the purposes of reading (the impact of the independent variable ‘reading purposes’ on the dependent variable ‘the use of reading strategies’). The results of the present study aim to provide important points for syllabus designers, teachers, and students. On the basis of the above discussion, the main research questions which the current study seeks to answer are as follows:

- 1- What are the main reading difficulties that NLS students face?
- 2- Which reading strategies are the most applied to solve reading obstacles and meet the reading purposes?
- 3- Is there any relationship between reading purposes and the most applied strategies?

The research questions are the conducting statements of the research. They came from the existing situation of learning English for specific purposes. Reading English texts is dictated by the needs of students to get information and knowledge. Thus, ESP students find themselves obliged to interact with specialised texts. It is, then, important to note that NLS students have only one session (one hour and half) per

week, it means that the opportunity to exercise the English language is very limited. The allotted time for learning and practising the language command does not enable to improve language proficiency. Hence, problems occur while writing, reading and even speaking. The major concern of the research work is the reading skill which is considered as an effective means to learn the language particularly that students can learn vocabulary and structures in their contextualised context. Some reading obstacles can be solved by the application of reading strategies especially at the level of word difficulty as consulting a dictionary. Further, in many cases, students are interested only in achieving their reading purposes as to answer a question or complete a diagram and so on. In order to find answers to the above formulated research questions, the hypotheses are set as the following:

- 1- NLS students face problems at the level of vocabulary and syntactic level in comparison with content knowledge.
- 2- NLS students rely mostly on content knowledge, visual data, translation, and scanning to get specific information.
- 3- There is a kind of relationship between the reading purposes and the most applied strategies.

For methodological purposes, the research is based on descriptive method in order to describe and analyse the reading deficiencies which NLS encounter. An analytical approach is also adopted to form an analysis of NLS students' reading strategies. The study analyses the reading strategies applied to solve reading problems and achieve purposes of reading. The above aims require the use of research instruments which allow the researcher to have data for the situation. In this connection, the interview aims to cast light on the situation of teaching ESP courses. It is designed for two teachers, a specialised teacher who teaches the population under study and the other is a part-time teacher who teaches students of Biochemistry and Agriculture. The questionnaire is designed to describe reading difficulties and analyse the extent to which NLS students use reading strategies to compensate for reading deficiencies. It means that data are analysed qualitatively and quantitatively.

In order to find answers to the research questions, the participants chosen for the present study are students of NLS, third year LMD, at the University of Laghouat. The total number of students is 29. NLS students are divided into two specialties:

animal ecology (écologie animale) and plant ecology ‘scientifically known as botany’ (écologie végétale). In the light of what has been discussed, the research work is divided into three main chapters.

Chapter one is devoted to the theoretical aspects related to ESP, reading, and reading strategies. It also deals with the elements that shape the reading process, focusing on the role of content and formal schemata. An overview about reading strategies is presented. A detailed description about the taxonomy of reading strategies is also provided.

The second chapter deals with the methodological aspects. It describes the tools that the researcher uses in the current study. The rationale for the selection of research tools is explained. Measurement scales of analysing the obtained data from both the teachers’ interview and the questionnaire of students are also discussed.

Analysis of the research procedures is presented in chapter three. The investigator presents and examines the obtained findings. The formulated hypotheses are proved or disproved after describing, processing, and analysing the results qualitatively and quantitatively.

Chapter One

Review of Literature

Chapter One

Review of Literature

1.1 Introduction

Since the 1960's, English for Specific Purposes (ESP) has progressively developed to be one of the most prominent areas of English as a Foreign Language (EFL). Hence, English has become a required subject for academic and occupational services. The following chapter tackles the theoretical issues which shape the research. It highlights the reasons that contribute to the development of the ESP approach. It also describes the importance of the reading skill in the ESP context. ESP learners need to access to knowledge written in English. They are required to read and understand texts related to their subject areas. Thus, a discussion of the reading process, its natures and theories, is provided. A detailed description about the reading strategies is also done since the current research deals with reading strategies used by ESP students in order to cope with specialised texts. Difficulties in language proficiency can be compensated by reading strategies to achieve the purposes of reading.

1.2 English for Specific Purposes

The reasons for the rapid development of ESP are due to the combination of both socio-economic factors and linguistic issues. Hutchinson and Waters (1987) succinctly indicated that three key reasons are behind the emergence of ESP: the demands of Brave the New World, a revolution in linguistics, and the focus on the learner (learner-centred approach). The results of Second World War and the oil crisis in the 1960's have contributed to a tremendous reshuffle in scientific, economic, and educational levels. Such changes have a great impact on the English language which established itself as the international language of communication. All the above mentioned factors influenced ESP.

Differences exist in how ESP is interpreted since it has had a relatively long time to mature. At first, Strevens (1977: 90) defined ESP courses as *“those in which the aims and the content are determined, principally or wholly, not by criteria of general education, but by functional and practical English needs of the learner”*. This definition reflects that the main premise of ESP is in indentifying the specific needs of the learner.

Similar to the view of Strevens (1977), Mackay and Mountford (1978: 2) indicated that the term ESP is generally used to refer to the teaching of English for a “*clearly utilitarian purpose*” which is defined by the learners’ needs. According to the aforementioned views, it can be noted that the learners’ needs are central element to ESP. Thus, an analysis of the learners’ needs is the starting point in the designing of ESP courses which focus on the learner instead of the teacher. Brumfit (1977: 71) also pointed out that “*an ESP course is directly concerned with the purposes for which learners need English, purposes which are usually expressed in functional terms*” (quoted in Zouaoui, 1987: 7).

According to Hutchinson and Waters (1987: 19), ESP is “*an approach to language teaching in which all decisions as content and method are based on the learner’s reason for learning*”. They considered the works of Ewer and Latorre (1969) *A Course in Basic Scientific English*, Strevens (1973) *Technical, Technological and Scientific English*, Selinker and Trimble (1976) as the prominent descriptive pioneers of English for Science and Technology (EST). The focus is on describing the underlying linguistic features of scientific texts to identify the grammatical and lexical items for such particular jargon (register analysis). The analysis of particular subject discipline forms has also shaped the development of ESP. In this respect, Mackay and Mountford (1978) explained the notion of ‘special language’ as a restricted “*repertoire of words and expressions selected from the whole language because that restricted repertoire covers every requirement within a well-defined context, task or vocation*” (quoted in Nodoushan, 2002: 5). But, ESP is not limited only to learning specific lexicon and structures related to a given specific register.

Hutchinson and Waters (1987) considered ESP as an *approach* rather than a *product*. Its foundation is based on the following question: “*why does this learner need to learn this language?*” (Dudley-Evan & St John, 1998:3). The answer to this question is related to the learner’ needs, the language required and the learning context. Therefore, a need is defined by “*the reasons for which the student is learning English*” (ibid). Analyzing the specific needs of particular learners serves as the prelude to an ESP course design, because it determines the ‘what’ and ‘how’ of an ESP course. The theory of needs constitutes the learners’ necessities, wants, lacks and deficiencies. Robinson (1991) also based her definition on needs analysis. She defined ESP in terms

of “normally goal-directed” and “needs analysis”. The above views focus on the learners’ needs as a key role in the design of ESP courses.

Lorenzo (2005:1) pointed out that ESP “*concentrates more on language in context than on teaching grammar and language structures*”. It implies that the focus should be given to the learning context. Dudley-Evans and St John (1998: 4) indicated that “*ESP teaching does not necessarily have to be related to content but it should reflect the underlying concepts and activities of the discipline*”. This means that ESP courses should follow a methodology that is different from the methodology used in general English. This point has also been raised by Carter (1983) when he stated that an ESP course is concerned with “*turning learners into users of the language, something which, unfortunately, due to time or curriculum pressures, does not always happen*” (quoted in Marza, 2012: 417). Such views focus on the way ESP learners should be taught. In other words, the emphasis is the methodology of teaching ESP.

ESP has been divided into sub-areas. Carter (1983) identifies three types of ESP: English as a Restricted Language, English for Academic and Occupational Purposes (EAOP), and English with Specific Topics. However, Hutchinson and Waters (1987) divided ESP into three major branches EST, EBE, and ESS as the following chart shows

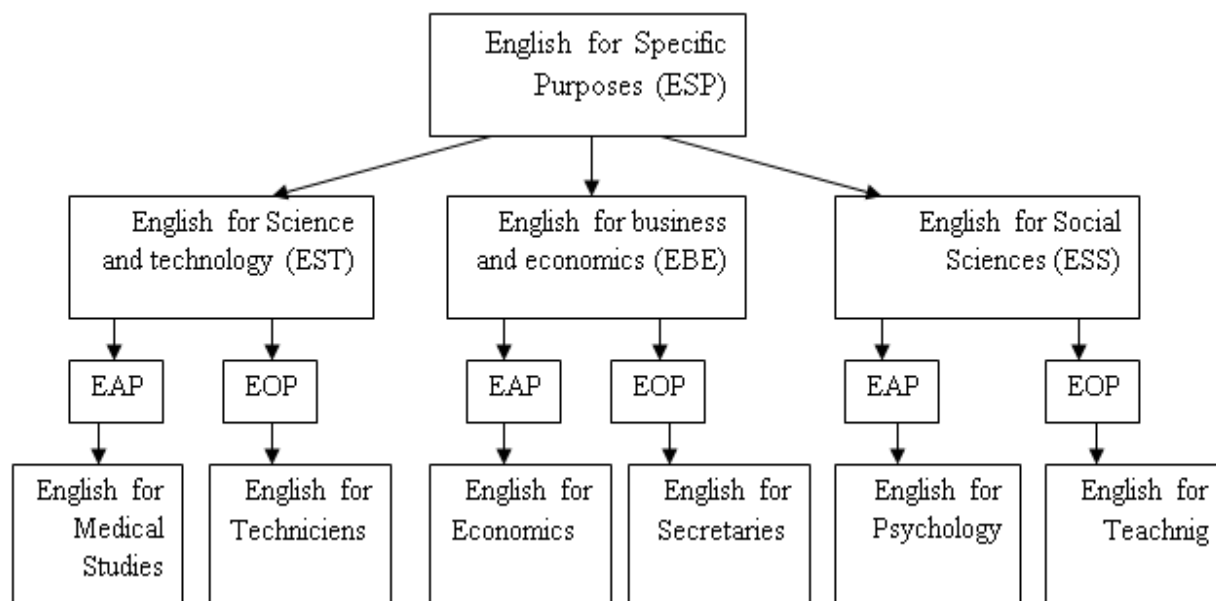


Figure 1.1: ESP division (Hutchinson and Waters, 1987)

1.2.1 Learners' Needs Analysis

There is a general consensus that needs analysis is a key factor in the ESP framework. It is defined as “*the collection and application of information on learners' needs*” (Flowerdew & Peacock, 2001: 178). Needs analysis is considered as the threshold of departure for designing a particular task or material; its main precept is to tune the curriculum to the specific needs of the learner. In this context, needs analysis is viewed as “*the process of establishing the what and the how of a course*” (Dudley-Evan & St John 1998: 121). Early examples of ‘needs analysis’ are those directed to get an idea of the purposes for which learners need English after their course. Moreover, the core of needs analysis was only the consideration of the target needs (known as target situation analysis) of learners, ignoring other requirements such as wants. However, ‘need analysis’ is more than just a specification of learners’ target uses of language; what is actually required, taking into consideration what they previously know, their wants, what they themselves wish to learn.

An approach to ESP needs analysis can be to ask the question why students of a particular subject-discipline are taking an English course. In what situations they will need or already need English, for which purposes they read and tackle texts. Information can be collected from people with responsibility of the course (teachers), learners, and the administration staff. The information to be gathered may also include learners’ primary motivation in learning English, their background knowledge of the subject discipline, and English proficiency.

The needs of ESP students differ on the basis of the field of specialisation and learning purposes. For example, needs of NLS students are about having the ability to access to and read scientific texts as vehicles for information and knowledge. Most science documents are published in English, students find themselves obliged to access to such knowledge in order to participate and interact in the field (further postgraduate studies).

1.2.2 The Importance of English in Subject Disciplines

With the growth of English as a *lingua franca* of work and study, numerous non-English speakers find themselves in urgent need to have some level of proficiency in

English for the sake of functioning in a particular job or a course. Due to the ever increasing educational, academic and professional demands for new knowledge and more information, learners are required to read -and comprehend- updated texts in their areas of study mainly journals and research articles which are usually written in English due to a lack of documentation and resources.

One can follow the development of English publications in the scientific streams, since World War II. English language has established itself as the most important language for international communication and the dissemination of scientific and technological information has prompted many educational institutions in the world to establish programmes that cater for such specific requirement. Moreover, it has been estimated that “50 percent of the world’s scientific literature is in English” (Mackay et al, 1979: 107 cited in Zouaoui, 1987: 3) and that the percentage of abstracted publications is steeply increasing. Indeed, as early as 1967, Wood has illustrated the predominant position of English through the following table:

Percentage of scientific and technological literature in English	
Chemical Abstracts	50.3%
Biological Abstracts	75%
Physics Abstracts	73%
Engineering Index	82.3%
Mathematical Reviews	54.8%

Table 1.1: Percentage of scientific literature (cited in Zouaoui, 1987:4)

The above table shows the great dominance of English and the huge publications in the field of sciences. Such factor urges students of scientific streams to get some proficiency in English in order to be able to up-to-date and read such publications. Thus, the role of English as a medium of communicating scientific and technological information is undeniable.

The Department of Science and Biology implemented an English module for students of ‘Nature and Life Sciences’¹. The English module is not simply learned for the sake of learning the language, but for specific purposes such as to perform professional and occupational activities. The content of the course is based on the linguistic aspects related to EST field (see the analysis of the interview in chapter three). Additionally, the course is about the students’ subject area; nature, biology aspects, organisms, geology, etc. Hence, the teacher supplies students with subject area topics. The only difference is the language of transmitting knowledge which is English not French. Thus, NLS students do not need all the English language. However, they need to understand courses presented in English; reading and understanding specialised texts, writing assignment, doing exercises, and to a broader level; presenting projects, using English knowledge required in the accomplishment of thesis, for example, reading an article in order to extract information about *photosynthesis*.

1.2.3 The Importance of Reading in ESP:

Most scholars agree that reading is one of the most necessary skills for educational and professional success. Reading can reinforce the learner’s other skills. In highlighting its importance, Rivers (1981) states that:

reading is the most important activity in...any class, not only as a source of information...but also as a means of consolidating and extending one’s[own vocabulary and] knowledge... (cited in Alemi&Ebadi, 2010: 570).

Yet, the objectives of reading are to make students acquire some knowledge about English in general. Second, push students to read scientific texts and articles related to their field. Third, integrate and exploit the specialised vocabulary attained during the ESP courses. Further, students face a lack of documentation and information sources in French and Arabic. It is, therefore, evident that English texts are considered as an opportunity for getting information and knowledge. As far as ESP is concerned, one of the crucial contributions to the approach of reading in ESP is the “*shift from Text As Linguistic Object (TALO) to Text As a Vehicle of Information (TAVI)*” (Dudley-Evan & St John 1998: 96). It is worth noting that a key principle for ESP learners is, as Johns and Davies (1983) view,

¹ Students of Nature and Life Sciences are chosen as the population of the research (see methodology)

Extracting information accurately and quickly is more significant than language details; that understanding the macrostructure comes before language study; and that application of the information in text is of paramount importance. The reader first processes the language and then links the ideas to what is already known. (ibid)

It is important to note that texts are seen as vehicles for information. What is expected from the module of English is to make learners read and understand English in its written forms. Learners have to develop some techniques in order to understand and get the meaning of the text. The following table clarifies the aspects of text as TALO and as TAVI

	TALO	TAVI
Principles underlying text selection	<ul style="list-style-type: none"> -texts illustrate syntactic structures -topics are of general interest -texts are specially written ,modified or re-written -new vocabulary is controlled -Texts graded and short -Texts are selected by teachers 	<ul style="list-style-type: none"> -Texts are chosen for their value in relation to students' needs -A range of authentic texts are used -Texts are of different lengths, getting longer -Texts are selected not only by teachers, but also by learners and others
Preparatory activities	<ul style="list-style-type: none"> -almost none -some translation of vocabulary 	<ul style="list-style-type: none"> -Always: important as direction finders, to awaken interest and to establish purpose
Working with the text	<ul style="list-style-type: none"> -Focus on language and what is unknown -Focus on detail and understanding all the sentences and words -Questions on syntax 	<ul style="list-style-type: none"> -Focus on information and what is known -Guessing unknown words -Focus on links between meaning (function) and form
Types of teaching/ learning interaction	<ul style="list-style-type: none"> -Teacher monologue -Teacher-centred: teacher questions, student responds, teacher evaluates 	<ul style="list-style-type: none"> -Students work in groups -Reversal of roles: students ask questions ,evaluate each other, reach agreements -Model for self-study -Learner and learning centred
Follow-up activities	<ul style="list-style-type: none"> -Comprehension questions -Grammar and lexis exercises 	<ul style="list-style-type: none"> -Using the information: transfer, application or extension -Applying techniques

Table 1.2: The aspects of text as TALO and TAVI (ibid: 97)

1.2.4 ESP Students' Purposes of Reading:

Since the context is learning a language for specific purposes, reading is used for different purposes; reading is considered as an effective means of extending one's knowledge. In this connection, Richard and Renandya (2002) state that:

... Many foreign language students often have reading as one of their most important goal. They want to be able to read for information and pleasure for their career and for study purposes...written texts serves various pedagogical purposes (Richard and Renandya, 2002: 273).

Hence, the aims of reading constantly vary from one situation to another according to the learner's needs, the nature of texts, and the interest of learners. For students who learn a foreign language, the purposes of reading are derived generally from those related to language improvement. So, the latter deemed as one of the most important purposes of reading. However, for students who learn a language for specific purposes, the purposes are related to the ability to read a textbook, to make a research, to answer exam questions or for occupational tasks. But why do ESP learners want to improve their foreign language? The response to such a question refers to something like 'to keep up to date with current research in nuclear physics'. It implies that "*purpose has nothing to do with language as such*" (Nuttall, 1982: 19). For ESP learners, the language is merely a tool of achieving particular knowledge in any subject discipline. It is seen as a driver for reaching one's goal. In this respect, this is an extension to the shift of text from a 'linguistic object' to a text as 'vehicle for information' (John and Davies, 1983).

There is a close connection between the purpose of reading and the text. It has been noted that reading for pleasure, though not always, specifies the choice of a text that is a narrative or literary in style. Whereas, reading for learning and acquiring knowledge specifically, though not always "*requires the selection of a predominantly informative [and expository] text*" (Davies, 1995: 132). It can be noted that the basic aims of the ESP students are as follow:

- To identify the important content of a text
- To answer a specific question
- To decide which section of a text to start studying

- To gain an understanding of new concept
- To learn new facts from the text
- To follow instruction or a process
- To locate specific information

1.2.5 The Importance of Context in ESP Reading

The contextualisation of texts is among the features of any ESP reading. It is the context of the text that can help learners during reading. Moreover, one aspect that characterises the courses of reading in each subject area is the contextualisation of the reading texts. In this sense, reading “*is not an isolated activity that takes place in some vacuum*” (Alderson, 2000: 25). Thus, in any content area course of reading, it is the context that determines the nature of the text. It can be said that texts are contextualised since the aim is reading for learning, attaining, and exploring more information. Therefore, context is an important factor since it paves the way to reading. At this stage, learners are able to specify the set of information they bring to the text. On the basis of the context, they recall their content schemata. Additionally, they are also able to predict the nature of the vocabulary of such a text. For example if the context is about the ‘carbon cycle’, learners will expect vocabulary such as: *production of carbohydrates, atmosphere, photosynthesis absorption of CO₂, respiration, combustion, formation of coal, and decompositions of rocks....*

It can be noted that reading in content areas is context-bound. Such a feature is adopted in any content area reading courses. On the other hand, it is found that some teachers do not base their courses of reading in content areas on context; they choose texts at random and ask learners to read these texts. Hence, learners may face difficulties. It is noted that “*a decontextualised view of reading is not sufficient to capture the intended meaning of the [text] in relation to its audience*” (Hudson, 2007: 21).

Furthermore, some ESP reading experts such as Robinson (1991) and Ellis (1993) suggest that it is very beneficial to integrate visual illustrations in the courses. This is what is called ‘pictorial context’. Visual aids and materials are provided to enhance and recall the textually presented information (Alemi & Ebadi, 2010: 571). In this respect, learners find it easily to relate the visual illustrations to the written form of the text.

1.3 The Reading Process

Reading is an overlap of many sub-processes and mental activities. Thus, reading strategies cannot be disassociated from the whole process of reading. Before specifying the nature of reading strategies, it is necessary to understand the process of reading.

1.3.1 The Nature of Reading

Nuttall (1982) viewed reading as *“not just a linguistic exercise but is involved with the getting of meaning out of a text for some purposes”* (1982: 4). She focused on the combination of the two sides of the coin: the reader and the text. In fact, the reader represents the top-down knowledge which he/she brings to the text. However, the text represents the bottom-up structure. She also noted that *“in FL learning, reading is often used for purposes which are different from those found in mother tongue learning”* (Ibid: 19). Nuttall (1982) explored the aspects that may make a text difficult to understand such as: subject-matter unfamiliarity, specialised vocabulary, and rhetorical patterns of the text (discourse markers and structure of the text). She highlighted the importance of using non-textual information which can facilitate the reading process. She noted *“recently people have become conscious that non-verbal information (such as illustrations, diagrams, graphs, and maps) can be of specific help in learning to read effectively”* (Ibid: 52). Non-verbal information can help students interpret the meaning of the text mainly for students who lack linguistic ability as a reading strategy.

Davies (1984, 1995) focused on the aspects of reading which receive a little interest such as the text. Although the text is a basic factor, it has received only minimal attention in analysing the process of reading (Davies, 1995). In this connection, she stressed its importance:

the text is given central importance and is seen to be the variable... that will most strongly influence the motivation to read, the approach to reading and the type of reading adopted (ibid: 84).

She also made a distinction between authentic text and simplified² one. The former refers to:

² Many views are given about authentic texts. Janet Swaffar (1987) considers the authentic text as *“one whose primary intent is to communicate meaning, in other words, such a text can be one which is written*

texts selected by a reader or a teacher that are recognised by the reader as meeting some need for information...aesthetic satisfaction or instruction in which aspects and patterns of language are learned within a meaningful context (Davies, 1995: 4).

However, simplified texts refer to texts written for foreign language learners. They are linguistically simplified by substituting frequently occurring vocabulary for infrequently occurring words, shortening sentence length, and restructuring sentences to reduce their complexity. Thus, the issue of text authenticity is still a subject of controversy and debate (see also Widdowson, 1978).

Davies (1995) highlighted the need to familiarise students with different text structures. In one of her previous works, she advocated the procedure of teaching students the notion of topic-type by getting them acquire and manipulate the specific semantic frames required for interpreting science texts such as sequence texts, process texts, characteristics and so on (Davies & Johns, 1983). The significance of the work of Davies (1995) is in providing insights about the possible structures of texts and features. So, it can be said that the contribution of Davies (1995) is very important especially that she tackled the process of reading from three perspectives: the reader, the text, and the process itself.

Alderson (2000) treated reading from different angles. He indicated that the nature of what readers read should have some relation to how they read (ibid: 1). He focused on the assessment of reading, "*those who need to test reading clearly need to develop some idea of what reading is*" (ibid: 2). His interest in reading strategies stemmed from an interest in characterising the process of reading rather than its product. The knowledge of strategies is very important, since the more awareness a reader has, the more he/she is able to use these strategies appropriately.

Alderson (2000) specified the factors which influence the nature of reading as the reader's background knowledge (schemata)³, the knowledge of the genre or text type, text organisation, verbal and non-verbal information. These features are essential to

for native speakers ...or it may be a text intended for language learner group. The relevant consideration here is not for whom it is written but that there has been an authentic communicative objective in mind" (Swaffar, 1985: 17).

³ With reference to schema theory (Rumelhart, 1980), Carrell (1987) distinguishes two types of schemata: content schema that is background knowledge, and previous experiences. Formal schema is the knowledge of language, previously learned textual and rhetorical structures.

determine the reading process. It is evident that Alderson (2000) most emphasis is on ways of assessing reading. He has also emphasised the reader's variables such as motivation, interest, purpose, in addition to the text's variables such as text topic (text genre) and text organisation.

It is interesting to note to the contribution of Hudson (2007). He explored the connection of how students read and how they learn to read in a second or a foreign language. He emphasised the point that reading should be placed within its context, though he puts a little focus on the decontextualised views of reading. It is worth noting that Hudson (2007) focused on the context of reading since it is considered as the pavement where the reader starts to progress. The value of context can allow students to connect what they are reading to their field of study in which "*...readers use a great deal of context to interpret words and sentences while processing text*" (Hudson, 2007: 8). Therefore, the current research pursues the extent to which context familiarity can help in understanding texts. In this respect, Hudson (2007) indicated that low proficiency⁴ can be less problematic when the reader is engaged in familiar contextualised topics. It can be noted that content area familiarity and low linguistic ability are features of students learning English for specific purposes.

It is clear that language is embedded in contexts, and it is the contextualized language that is of importance to most language users. Thus, [foreign] language reading methods, materials...should focus on context and purposes and deal with language specific problems as they merge from context. (ibid: 28)

Context familiarity is a precursor to investigate the extent to which context can be used as one of the reading strategies to facilitate understanding of texts in the ESP framework. According to Hudson (2007), the main emphasis is that reading takes place in particular context and also for a particular purpose. It seems that Hudson (2007), unlike the aforementioned ones, stressed the issue that low proficiency can be less problematic when the reader is engaged in a familiar context in addition to the discipline familiarity. Language deficiencies can be compensated by content schemata knowledge.

4 Becoming a successful foreign language reader involves overcoming both language problems and reading difficulties.

Last but not least, Erler & Finkbeiner (in Cohen & Macaro, 2007) noted that any study about foreign language reading cannot be easily achieved. They came up to the point that foreign language reading researchers have admitted the interactivity of the reading process (for example Carrell, 1985; Bernhardt, 2000; Grabe and Stoller, 2002 etc). This means a conceptualisation of a continuum rather than a dichotomy. In this context, Erler and Finkbeiner state that

since 1990's reading comprehension has been seen increasingly to be the result of complex interactions between text, setting, reader, reader background, reading strategies, the L1 and the L2, and reader decision making. (Cohen & Macaro, 2007: 188).

It can be said that all these factors contribute together to shape the reading process.

1.3.2 Theories of Reading:

Approaches and models have evolved to explain the processes involved in reading.

1.3.2.1 Bottom-up Theory:

Bottom-up approaches view reading as a series of stages. Word recognition takes place prior to comprehension. It implies that readers have to develop 'word recognition' as a first step for whole understanding. Carroll (1964) defined reading

ultimately as the activity of reconstructing (overtly or covertly) a reasonable spoken message from a printed text, and making meaning responses to the reconstructed message that would parallel those that would be made to the spoken message (Hudson, 2007: 34).

So, the key elements are the phoneme-grapheme correspondences⁵ notions and the information processing view of reconstructing an existing message. Reading requires the processing of all graphemic information on the page. This means that the reader starts with the printed word, recognises graphic symbols, decodes them into sounds, recognises words and decodes meaning. In other words, the reader reconstructs meaning from letters, words, phrases clauses, and sentences by segmenting the text into

⁵ Phoneme-grapheme correspondence refers to the relationship between a letter's graphical form and the sound that corresponds to it. For example the 'S' grapheme has different sounds that represent it as in 'simple, ship, division, dogs. Reading specialists see that the mastery of phoneme-grapheme correspondences is essential to reading success (Hudson, 2007: 301).

phonemic units that represent lexical meaning in a linear⁶ manner. Moreover, Gough (1972) showed how readers pass through a reading process in which their visual system scans the series of letters one by one. He denoted “*I see no reason ...to reject the assumption that we do read letter by letter. In fact, the weight of the evidence persuades me that we do serially from left to right*” (ibid: 35).

A closer look at the above discussion, one can deduce that bottom-up approaches to reading, whatever their precepts, emphasise the value of processing a text in a linear way, from letters, to words, then to sentences and paragraph and last to a whole texts. Researchers are interested in the way a reader reads a text rather than in what the reader understands. This led many specialists in the field of reading to divert their focus on the comprehension process per se such as Alderson (2000).

1.3.2.2 Top-down Theory:

Top-down approaches have been developed within the theoretical framework of psycholinguistics and some sociological perspectives, particularly those of Smith (1971-1994) and Goodman (1975-1985). According to Goodman (1985), readers use their knowledge of syntax and semantics in order to decrease their reliance on the print and phonics of the text. He coined the term ‘reading as psycholinguistic guessing game’. It means that “*readers guess or predict the text’s meaning on the basis of minimal textual information and maximum use of existing, activated knowledge*” (Alderson, 2000: 17). This reveals that readers are engaged in a process of recalling previous knowledge which is relevant to the textual miniature. In this respect, Goodman (1985) distinguished four sub-processes in reading: *predicting*, *sampling*, *confirming*, and *correcting*. Hence, readers predict and form samples to their prediction and on the basis of their knowledge they correct or falsify them.

Another notable work within the framework of top-down nature of reading is conducted by Smith (1971-1994). He postulated that the reader takes too much time to process all the visual cues. That is why he addressed the role of *short-term memory* and *long-term memory* in which he deemed *prediction* and *use of context* as tools that can pave the way for any bottleneck of memory during reading. Smith (1994) stressed the

⁶ Linear manner means in a series of stages; from words to sentences, and from sentences to the whole text

extreme importance of background knowledge, or schemata in a reader's building of meaning during the processing of texts. Therefore, he noted that:

Knowledge of relevant schemes is obviously essential if we are to read any kind of text with comprehension. [a reader] who does not have a scenario about farming is unlikely to understand a story [or a text] about farming or a reference to farming text book (Hudson, 2007: 38).

Smith (1994) appeared to highlight the reader's contribution to the text; experience with the reading process, knowledge of the context of the text, familiarity with patterns of the text, specific text types, in addition to the knowledge of genre and specific subject matter (Alderson, 2000). Such knowledge helps the reader to understand any given text.

Systematically, top-down approaches promote the importance of the reader's role in the reading process, predicting, guessing, and using background knowledge. Similarly, the reader does not necessarily read each word in the text as it is demonstrated in bottom-up models. But, it is not enough to use background knowledge, form prediction, and after confirm such predictions which may not be relevant. The reader needs to understand the text which is a set of graphical symbols based on typical rhetorical pattern⁷. Thus, the ability to recognise words and sentences accurately is also important factor of reading particularly when dealing with specialised subject-discipline texts which also require students to handle exact and specialised vocabulary.

1.3.2.3 The Interactive Model:

The interactive model⁸ refers to the "*the simultaneous processing of information from more than one source*" (ibid: 63). The interactive model emphasises the interplay of both bottom-up and top-down approaches. In this respect, reading is viewed as a parallel processing. So, it is a kind of dialogue between the reader and the text. Rumelhart (1977) described the interactive model in the following schematic structure

7 Rhetorical patterns are communicative devices for signaling the logical or rhetorical relationships amongst clauses and sentences in a text. For example; comparison, classification, problem-solving.... (Davies, 1995: 173).

8 A model of a reading process is considered by Davies (1995: 57) as "*a formalized, usually visually represented theory of what goes on in the eyes and the mind when readers are comprehending (or miscomprehending) text*". Davies puts forward some characteristics for a model as being "*a systematic set of guesses or predictions about a hidden process, which are then subjected to testing through experimental studies*" (ibid.).

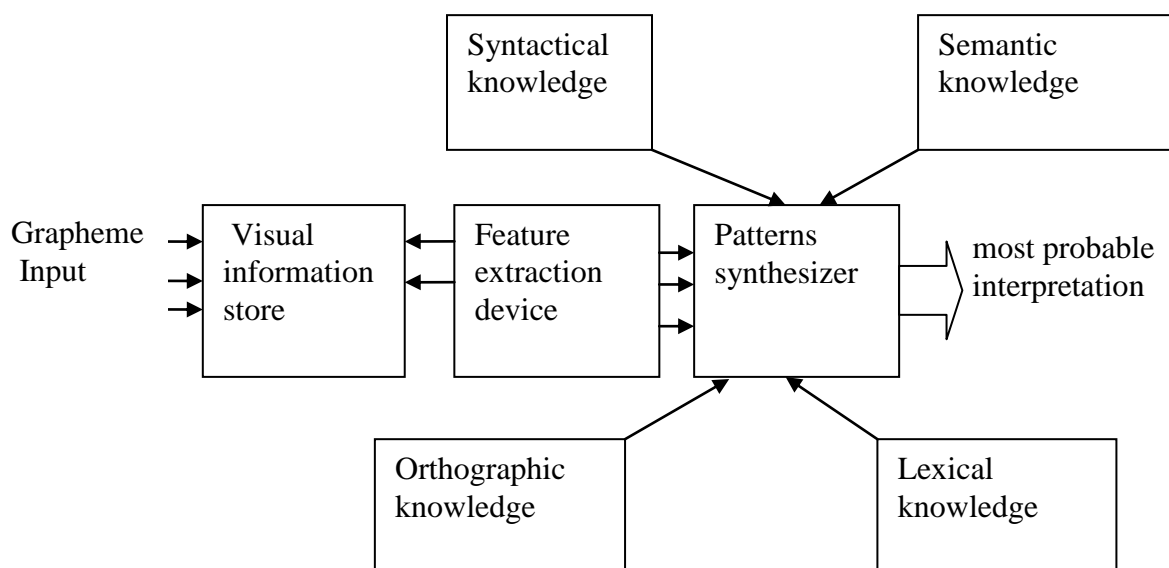


Figure 1.2: The interactive model (ibid: 64)

The above figure 1.1 describes that the sources of knowledge come together at one place and the reading process is “*the product of the simultaneous joint application of all knowledge sources*” (ibid, 65). The interactive model acknowledges the communication between top-down and bottom-up processes. The model accounts for ‘schema-theoretic’ views (Anderson and Pearson, 1984; Pearson and Tierney, 1984; Carrell, 1983, 1987...) which focus on the role of schemata, knowledge stored in memory linguistic, metalinguistic, and content knowledge.

1.3.2.4 Schema Theory: a Development of the Interactive Model

The role of the reader’s knowledge is undeniable in the reading process. According to schema theory, “*each person brings a set of unique experiences and knowledge, known as schemata to reading experience*” (Tankersley, 2003:118). From another perspective, schema is considered as knowledge structure “*it could be a concept, or it can be a set of related concepts, and it can be about object, ideas, or phenomena*” (Irwin, 2007: 143). Readers activate what is relevant to the text and shape the incoming information. ESP students have an immense content schema and, to some extent, a limited formal schema. So, they can rely more on content knowledge to compensate for some linguistic schema deficiencies in order to reach purposes of reading. According to the text’s clues, the reader selects the appropriate hierarchy of schemata. Within these hierarchies are schemata which are embedded in other clusters, and which themselves contain others. These schemata

vary in their levels of abstraction, and represent all sorts of knowledge, such as objects, academic topics, rules, events, routines and social situation. They represent knowledge... [They] are symbolic representations of knowledge which may be used for understanding language (Clapham, 2001: 85-86).

Schemata are described as interlocking mental structures representing the reader's knowledge. When readers process texts, they integrate the new information from the text into their previous knowledge and experiences. As mentioned before, there are two kinds of schema, formal schema and content schema. The former implies knowledge of language, linguistic convention, including knowledge of rhetorical structures, and the main features of particular genre. Content schema refers to the knowledge of subject matter (knowledge and familiarity with content discipline).

(a) Formal Schemata:

Formal schemata represent the reader's knowledge of language (grammar, vocabulary, and syntax), conventions, text structure and rhetorical structures of different types of text (particular genre) (Hudson, 2007: 165). Each of these aspects plays a key role in helping the reader to be familiar with the rhetorical type of the text he/she wants to process. Any foreign language reader needs some language proficiency in order to read a text. Difficulties are encountered when the reader is not well equipped. Alderson (2000:36) indicated that learners "*must first acquire language knowledge before they can read*".

The reader's linguistic knowledge continues to develop over experience. The more students read, especially what is related to their subject discipline, the more they acquire vocabulary, knowledge and rhetorical structures associated with a particular type of a text. More recent approaches to the teaching of ESP postulate that students need to know the language of particular subject discipline: initially lexis, and then syntactic and rhetorical features which shape the text's genre. An example of this can be illustrated as follows:

. . . ESP textbooks presented learners with specialist text to be read. Each section of the books followed the same pattern: test paper, lexical simplification, structural simplification, followed by exercises like vocabulary exercises, structures exercises, questions on the texts, and summary of the content of the text (Ibid)

One can deduce that the aim behind such discipline tasks and exercises is to equip ESP students with the necessary linguistic and metalinguistic schemata. Such knowledge has a strong influence on the way students read texts.

(b) Content Schemata:

Content schema refers, as stated earlier, to the general background knowledge and cultural experiences. In this respect, Freire and Macedo (1987) viewed that

reading does not consist merely of decoding the written word of language rather it is preceded by and intertwined with knowledge of the world. Language and reality are dynamically interconnected. The understanding attained by critical reading of a text implies perceiving relationship between the text and content (Hudson, 2007: 142).

So, reading is not just deciphering the written form on the page. It makes a bridge for recalling the previous knowledge and connects it with the written form in order to complete the image of the text. ESP students have developed strong content schemata since they are highly involved in their subject discipline. Such knowledge can help them compensate for obstacles they face. Further, Alderson (2000:44) stated that “*familiarity with subject matter can compensate for inferior linguistic proficiency*”. If the reader does not know anything about the topic of the text, he/she will face a difficulty in processing it. In this connection, Nuttall (1982: 6) demonstrated that one of the aspects that make a text difficult to understand is the non familiarity with the text’s subject discipline. One can state the following, as an illustration.

The formation of cholesterol is a lipid-like substance, some of which is required as an important constituent of cell membrane, particularly of nerve cells. Excess cholesterol is excreted in the bile. If there is a considerable surplus, it may precipitate in the gall bladder, or bile duct, as gall stones, these sometimes block the bile duct, leading to obstructive jaundice in which the skin acquire a characteristic yellow appearance due to retention of bilirubin in the blood (Roberts, 1982:207).

So, this text requires more familiarity with the subject discipline in order to be understood. It can be comprehended deeply only by a biology or medicine reader. It seems that ESP students find it relevant to read texts in their areas of study. This can be considered not just as a facilitating role, but also as a motivating factor. This is why

“*subject matter familiarity might be expected to have a facilitating effect*” (Alderson, 2000: 44).

1.3.3 Reading in Content Areas

*Reading in content areas*⁹ is also referred to as *subject matter reading* and *disciplinary reading*. It includes what specialists call *reading to learn*. These terms refer to reading, understanding, learning, and using content area or disciplinary texts such as texts in science, history, or geography for the purposes of gaining, demonstrating, and to some way creating knowledge in that discipline. Reading in content area is influenced by the dispositions of students who read in the subject disciplines. It is influenced by background knowledge, understanding of the discipline, attitudes and interest in the subject matter, and ability (language and reading) levels.

The main purpose of reading is *reading for learning*, such as looking for *specific information*, extracting *the gist of the texts*, and the acquisition of new knowledge. As a first step, reading is a purposeful task. The first and foremost focus is mainly on achieving the purposes. In this context, Davies (1983:105) stated that

It is proposed that if the objective of learning for specific purposes is the acquisition of knowledge in a particular subject area, then the primary focus should be on the underlying forms of knowledge which are represented in a text (quoted in Zouaoui, 1987:234).

So, learners focus on the text in order to obtain the information they need. One can deduce that reading provides knowledge and information in the subject discipline. Jordan (1997:145) stated that “*the reading purpose is clearly fundamental to all reading in EAP*”. Therefore, learners have a specific purpose for their reading which is based on the situation they are in.

As far as the context of ESP is concerned, *reading to learn* requires disciplinary knowledge and expertise. For example, reading science texts require a different set of understandings and knowledge. Generally, understanding disciplinary texts is succinctly

⁹ The term *content area reading* is coined by William Gray (1925) where he provided the first formal perspective on the relationship between reading and other school subjects. For him, reading is a means of gaining information, it is essential in every content subject, such as history, geography, science, and literature. In fact, rapid progress in these subject disciplines depends in a large degree on the ability of students to read independently (Moore, 2009: 3).

related to familiarity with subject discipline and language knowledge. In this connection, Camiciottoli (2002: 169) indicated that *“it is the content that drives language learning”* in which the aim is acquiring content knowledge. Further, students are required as they read science texts to master a knowledge base that represents the current knowledge and understandings of the *discourse community*. Therefore, they must be able to understand vocabulary and key concepts related to their content area.

1.4 Reading Strategies:

Reading strategies focus on creating and maintaining meaning. They can be seen as interactive processes which has the aim of obtaining meaning from the text.

1.4.1 Defining Reading Strategies

Researchers have addressed the issue of reading strategies from different perspectives. They (Block, 1986; Carrell 1989; Kern, 1994; Singhal, 2001; Bernhardt; 2005; Hudson, 2007 ...) based their research on theoretical and empirical methods suggesting that strategies and techniques can be used to facilitate reading comprehension. It can be said that the notion of ‘reading strategies’ varies in terms of definition from a researcher to another. According to Cohen (1990: 83), reading strategies are *“those mental processes that readers consciously choose to use in accomplishing reading tasks”* (quoted in Zhang and Wu, 2009: 39).

Block (1986) defined reading strategies as techniques and methods readers use to make reading successful. These methods include: what textual cues they attend to, how readers make sense of what they read, and what they do when they do not understand (Seng and Hashim, 2006). Moreover, Oxford and Crookall (1989) postulated that reading strategies *“are defined as learning techniques, behaviours, problem-solving or study skills which make learning more effective and efficient”* (quoted in Singhal, 2001: 1).

From another perspective, research on reading strategies reflects a shift in attention from a focus on the product of reading, for example, a score on a reading comprehension test, to process-oriented research which emphasised determining the strategies that readers actually use while reading (Alderson, 2000). Reading strategies are of interest for what they reveal about the way readers manage their interaction with

the written text and how these strategies are related to text comprehension (Singhal, 2001).

Block (1986) studied non-proficient students of English as a foreign language (EFL). She found that successful readers use more general strategies which include the ability to integrate their understandings from the text with information which they discern from the text structure. Thus, low proficiency is not a problem. It can be compensated by some specific strategies particularly when readers are able to recognise the text structure. In the same context, Carrell (1985) stated that “*low proficiency readers used more text-based strategies*” (Erler & Finkbeiner in Cohen & Macaro, 2007: 190).

It is important to indicate that both Block (1986) and Carrell (1985) found that low proficient readers rely on the characteristics and variables of the text. Indeed, features of the text such as *text structure* and *non-linguistic data* (visual aids and pictures) can help readers achieve comprehension. But, language proficiency is still seen very important because the text is composed of sentences and paragraphs which need bottom-up knowledge. Moreover, Sarig (1987) found that there is a connection between bottom-up strategy and less successful reading comprehension. She used a think-aloud¹⁰ protocol to discover strategies used by girls while they were reading in L1 and L2. She observed that the choice and the effectiveness of strategies in terms of comprehension are similar for both L1 and L2. She suggested that strategies are apparently transferred by her readers from L1 to L2. In this connection, some studies emphasised the issue of transfer and considered it as very helpful. Jiménez, Garcia, and Pearson (1996) found that good readers effectively transfer knowledge back and forth between languages, accessing cognates as well as translating (Hudson, 2007).

Similarly, Kern (1994) stated that translation is an important strategy used by second and foreign language students. She indicated that “*translation supported the reader’s sense that what was comprehended was correct. In other words, the L1 was used to reduce the cognitive load during L2 reading comprehension*” (Erler and

10 Think-aloud protocol (or think-aloud protocols, or TAP) is a method used to gather data. Think aloud protocols involve participants thinking aloud as they are performing a set of specified tasks. Users are asked to say whatever they are looking at, thinking, doing, and feeling, as they go about their task (Cohen & Macaro, 2007)

Finkbeiner, 2007: 196). Readers transfer the L1 comprehension strategies into the foreign language reading. At this point, Yamashita (2002) noted that the issue of reading transfer between L1 and L2 or any foreign language is analysed under the frameworks of two dichotomies:

The linguistic interdependence and the linguistic threshold hypothesis. The former, in its simple form, states that L1 reading ability transfers to L2 reading. [It can be anticipated] that skilled L1 readers read well in L2. The linguistic threshold hypothesis proposes that a certain threshold level of L2 proficiency is necessary before L1 reading ability transfers to L2 [or foreign] reading (Yamashita, 2002: 81).

Therefore, it is plain that the issue of transferring abilities and strategies between languages is always present in the context of learning foreign languages. It plays an important role in facilitating learning and subsequently comprehension though it is not always positive, it may affect negatively the whole process of learning. Moreover, Finkbeiner (2005) studied the relationship between motivation and interest in reading, reading strategies and comprehension. The major findings are “*strategies varied according to text, themes, contents, context, and emotional involvement...strategies differed in their levels of consciousness*” (Erler and Finkbeiner, 2007: 200). This means that some special factors influence the use of reading strategies.

Bernhardt (2005) maintained that the necessary components of a contemporary L2 reading model should consider readers’ first language (L1) literacy levels, L2 knowledge levels and the interactions of vocabulary levels, processing strategies, background knowledge, relationships between and among various cognates and non-cognates. She argued for a compensatory processing model for L2 reading which recognised knowledge sources acting in an interactive system contributing to meet the purposes of reading (Zhang & Wu, 2009: 37). Indeed, content area reading needs cumulative background knowledge (content schemata) and the acquisition of some special vocabulary in addition to linguistic textual elements.

Taken together, L2 reading research indicated that reading is an interactive meaning-making process in which readers use a multitude of strategies to achieve the goal of comprehension. Hence, an approximate definition of the concept of reading strategies can be seen as:

Plans or methods that can be used or taught to facilitate reading proficiency. Examples of reading comprehension/reading strategies are inferencing, key word method, grouping, resourcing, transfer, elaboration, imagery and deduction (Shah et al, 2010: 141).

Bearing in mind the above studies, the basic conclusion that can be elicited from the research literature on reading and reading strategies indicates the immersion and overlap between them.

1.4.2 The Nature of Reading Strategies:

Reading strategies are seen, primarily, as learning techniques which learners use to fill a gap they have in reading. Some views use the term *reading strategies* and *reading skills* interchangeably. Although, Alderson (2000) demonstrated that there is a lack of adequate definition of reading strategies, Wenden (1987) pointed out that reading strategies refer to

Techniques, tactics, potentially conscious plans, consciously employed operations, learning skills, basic skills, functional skills, cognitive abilities language processing strategies, problems solving procedures (quoted in Alderson, 2000: 308).

The above view reveals the extent to which the term is a ‘pot’ for multiple issues. In this respect, Davies (1995) described the term as a problem of definition. So, a consensus among researchers for a concise definition of *reading strategies* is not attributed. Moreover, Kletzein (1991) defined a reading strategy as “*a deliberate means of constructing meaning from text when comprehension is interrupted*” (quoted in Davies 1995: 50). Barnett (1989) referred to *reading strategies* as a “*mental operation involved when readers purposefully approach a text to make sense of what they read*” (Seng and Hashim, 2006: 4). In addition to what has been stated, reading strategies are “*plans for solving problems encountered in constructing meaning*” (Ibid). In fact, the term is open to many interpretations. Carrell (1998) noted that *reading strategies* can be virtually impossible to distinguish from other cognitive processes related to thinking, reasoning, studying, or motivational strategies.

Thus, the common point between the above-mentioned notions is that they are considered as tools for facilitating text comprehension. Thus, the term ‘strategies’

focuses on the reader's active participation and actual manner of doing something. In a way or another, readers bring an array of strategies to help them in the process of meaning constructing and comprehending. Such strategies run the gamut from such known reading behaviours as skimming and scanning to rereading, contextual guessing, making predictions, using cognates to understand, to more recently recognised metacognitive strategies as activating background knowledge and self regulated techniques. In short, reading strategies are processes used by students to enhance reading comprehension and overcome comprehension failure.

1.4.3 Taxonomy of Reading Strategies

First of all, readers may approach any text with the purpose of understanding since reading is a goal-oriented activity. The following lines provide a description for the major strategies.

1.4.3.1 Skimming and Scanning

Skimming and scanning¹¹ are among the major strategies that are used mostly by readers. Both of them are related to the reader's flexibility in speed and comprehension. Skimming is defined as "*a rapid style used mainly to establish what a text is about before deciding where to read*" (Davies, 1995: 137). Skimming is used for obtaining the general sense of the text. It means a quick glance at the text for the sake of getting its general meaning (Nuttall, 1982: 34). The reader reads the text as quickly as possible in order to see what the text revolves around or to appreciate its rhetorical style. For example Biology students may skim the text to decide whether it is relevant to their subject area or not. On the other hand, scanning is "*a kind of skimming to see if a particular point is present in the text to locate it*" (Davies, 1995: 137). Further, scanning is "*glancing rapidly through a text either to search for specific information (eg.name a date) or to get an initial impression of whether the text is suitable for a given purpose*" (Nuttall, 1982: 34).

It is evident that scanning is a quick and efficient way of locating specific information based on the needs of the reader. Thus, scanning is a good way of saving time and energy. In fact, skimming and scanning are important ways of processing texts.

11 They are considered as types of reading (Grellet, 1981).

They have the property of enabling readers to select texts and parts of the text which are relevant to their interest and need. For example, if the NLS student has a research about the aspect *erosion*, he/she may use such strategies to decide which texts and articles are in relation to his/her research. Skimming and scanning are kinds of reading, but many readers use them as efficient strategies to take a global idea about the text.

1.4.3.2 Previewing

Another strategy which is used by readers is a text preview. It is *“a technique that motivates students to read for understanding by providing a structure with which they can integrate prior knowledge with the text”* (Klingner et al, 2007: 104). Thus, previewing is learning about a text before reading it thoroughly, doing so enable readers to get a general sense about the text. Another reason behind text previewing is to make readers use their prior knowledge about the topic of the text for the sake of getting more attention and interest. This strategy includes the use of visual clues in the text as charts, pictures, and diagrams, surveying the headings, and text type structure. Moreover, if the reader is going to read books and articles he/she can do so by *“using table of contents, the appendix, the preface, the chapter and paragraph headings in order to find out where the required information is likely to be”* (Grellet 1981: 17-18). This is beneficial when readers gather data (Books, articles...) to make a research or perform a presentation. Therefore, previewing content is seen as an important strategy for readers of content areas texts.

1.4.3.3 Activating Background Knowledge:

Current theories of reading emphasise the importance of integrating background knowledge in the reading process. Activating background knowledge can be done by some strategies such as prediction. The latter is *“a guess related to a future event based on clues”* (Johnson, 2008:145). Collins and Smith (1980) defined predictions as *“hypotheses about what will happen”* (Irwin, 2007: 91). Predictions help readers monitor their comprehension and focus their attention on important information. Alderson (2000) postulated that prediction strategies are frequently held to be important for readers to learn, engage their background knowledge and encourage learners monitor their expectations as the text unfolds.

Predictions are made about the content of the text. They are based on the current context of the text and the other discourse features of the text. They can be as well based on the title of the text, subheading, illustrations and the quality of vocabulary embedded in the text. For example, if the text consists of the following terms: human body, respiratory system, digestion, the endocrine system, lungs, the nervous system, the circulatory system, and hormones, readers can make an inference that the text is about ‘the functions of the parts of the human body’.

1.4.3.4 Strategies to Figure out Unknown Words

As far as reading is concerned, ESP learners read specialised texts. They are familiar to the content knowledge but they may face difficulties in getting the meaning of words. For this reason, it is very important to develop some ways of understanding and explaining the ambiguous words.

(a) Context Clues

During reading, students may face some unfamiliar words. Such a difficulty can be compensated by using context clues. The latter are “*effective way[s] to help students learn words meanings*” (Jennings et al, 2007:257). The reader uses the context that surrounds the unknown word in order to reveal its meaning. In many cases, “*it is the context of the sentence that may determine word meaning*” (Tankersley, 2003: 53). For example, the word ‘fall’ can refer to many meanings, this depends on the context in which it is stated.

Although the context, in some cases, does not provide an exact meaning of unknown word, it gives some clues related to its network. Systematically, “*word meaning is nuanced by the context in which it appears*” (Hunt & Beglar, 2005: 18). The clues vary on the basis of the sentence structure, they can be “*examples, contrasts, definitions, or restatements that provide some information about a word’s meaning*” (Klingner et al, 2007: 66). The use of this strategy requires some general language knowledge, i.e. formal schemata, and knowledge of sentence structure (the morpho-syntactic level of the sentence). The reader also needs to make connections between the general meaning of the text and the unknown word. In other words, the reader relates the words to the meaning of the text in order to know how they realise the whole meaning. For example if the text contains words as microbe, virus, infections, spoiled

food, minute living things, non cellular entities and germ. The reader can make connections and deduce that the text is about *microorganisms* and *bacteria*. Furthermore, there are several types of context clues that the reader can use to find out the meaning of a word within the context of what he/she is reading, among them definitions. When the unknown word is equated with a word that is known or familiar to the reader such as:

Definition (1)

“The endocrine system is one of the biological systems. It consists of various glands such as the thyroid, sex and adrenal glands.” (Bates & Dudley Evans, 1976: 47). In case the reader does not know what is meant by the *endocrine system*, he/she can then use the context in which it is found. Thus, he/she may deduce that it is one of the human body systems which produces hormones.

Definition (2)

“...much more is known about the pituitary gland. This is certainly an endocrine organ, secreting a variety of hormones controlling such functions as water and salt balance, growth metabolism” (Roberts, 1982: 286). Similarly, if the reader does not know the meaning of *the pituitary gland*, he/she refers to the context where it provides clues about organ, hormones, control, etc. Hence, he/she can relate the term to the system of producing and controlling hormones in the human body. Another clue that can help the reader is the case of synonyms in which an unknown word can be joined with its synonym or other closely related words such as the underneath example.

Synonym (3)

Synonyms provide some clues to clarify and explain some words. Some synonyms are presented in the form of appositive. An appositive is just a phrase that follows a word and explains it. It can be a word, a noun phrase, or phrase. Synonyms are introduced in phrase set off on both sides by commas.

*“The body of an animal is constantly being invaded by **micro-organisms, bacteria and viruses**, which enter by the body’s orifices, especially the mouth and the nose”* (ibid: 250). So, bacteria and viruses are related to the network of microorganisms.

Furthermore, the reader can follow the below stated steps to guide him/her use context clues:

- 1- Look at the unfamiliar word, and then read the sentence before and after the word.
- 2- Connect what he/she knows with the text.
- 3- Then, try to predict the meaning of the word on the basis of its position in the sentence.
- 4- Confirming or revising this prediction, if the reader finds that his/her prediction is not relevant to the text meaning, he/she can use other resources such as using a dictionary or asking a colleague (Jennings et al, 2006: 257).

Learning from the context is a very effective way. It can be noted that foreign language students acquire most of their vocabulary in this way. Moreover, using context clues help learners to read independently.

(b) Morphemic Analysis:

Morphemic analysis is one of the ways that can help readers recognise some unknown words. This method is designed to analyse *“the structural parts of words – prefixes, suffixes, and roots – are helpful in giving students effective clues to meaning”* (ibid, 259). In the same context, it is noted that *“prefixes and suffixes and their related meanings are helpful to unlock new vocabulary terms”* (Tankersley, 2003: 69). Consequently, knowledge of morphology can contribute to expanding and elaborating students’ vocabulary knowledge. Indeed, students who are familiar with English morphology are able to recognise more of the words that they encounter in reading passages (Hunt & Beglar, 2005). In this connection, it is helpful to know the meaning of prefixes and suffixes. The following table gives some prefixes and their conventional meaning

Prefixes	Meaning	Example
Anti	Against	Anti-biotic, anti- nuclear
Bi	Two	Biannual , biped
Centi	Hundred	Centimeter
In, im, il, ir	Not	Inadequate, impure, irreversible
Mis	Wrongly	Misbehave, misapply
Multi	Many	Multi-disciplinary, multi-dimension
Pre	Before	Prehistory, prearranged
Re	Again	Return
Sub	Under	Subway, subaqua
Semi	Half	Semicircle
Super	Above	Superpower, supernatural
De	Opposite of	Decompose, deconstruct
Fore	Before	Forecast,
Inter	Between	Intercontinental, interbreeding
Over	Too much	Overproduction, overuse
En	Cause to, put into	Enable, enact, entitle
Co-	Together	Co-existence

Table 1.3: Common prefixes. Adapted from Klingner et al (2007) and Saddleback Educational Publishing (2002).

Thus, mastering the meaning of these prefixes may help students attain and restore the meaning of some words which they may face in their reading. In addition to prefixes, suffixes can also have a helpful role. students can use them as word-learning strategies. The following table provides some example:

Suffix	Meaning
Able to	Able of , worth of
Ful	Full of , abounding in
Hood	State of being
Ment	State of, quality of
Less	Without , free from
Ly	In a manner
Ness,	Having a quality
Er, or, ist	Agent, one who
Ward	In direction of

Table 1.4: Suffixes and meaning (Saddleback Educational Publishing, 2002).

It is interesting to note that being aware of these meanings of word parts (prefixes, suffixes) can help to unlock the meaning of words found in reading.

1.4.3.5 Discourse Comprehension Strategies

It is necessary to have some basic vocabulary knowledge, but it is not enough only to know the meaning of words. A text is not merely a set of linked words. However, a text is a form of discourse shaped by its rhetorical acts and sentence structures. Each text has specific discourse features. This depends on the text genre. In this connection, having such knowledge about the text organisation and structure is a helpful factor in reading. Awareness of text organisation is seen as an important part of the reader's overall comprehension. Moreover, when readers are more familiar with the way a text is organised, it can help them form expectations about what they read and the way they process the incoming information.

The discourse structure of a text can be represented by the system of discourse coherence relations which are held between sentences and segments of the text. In other words, discourse markers¹² create cohesion and coherence in the text by building relationships among ideas that are expressed in the text. Hence, Fraser (1999) described discourse markers as *“a class of lexical expressions drawn primarily from a class of*

12 There are four types of discourse markers used in combining the English sentence: coordinating conjunctions, connectors (adverbials and conjunctive adverbs), subordinating conjunctions, phrasal linkers (transitions).

conjunctions, adverbs and prepositional phrases” (quoted in Jabeen et al, 2011: 70). In this respect, they are ‘lexicalised phrases’ (words) that are supposed to have a function of organising discourse structure. For example, because, for this reason, and therefore are markers for ‘causal’ relations. Whereas, and, in addition, etc, are ‘additive’, however is ‘adversative’. Discourse markers¹³ and connectives such as: *but, because, however, therefore, in addition, likewise...* provide the reader with relationships between ideas represented in sentences and clauses. Functions of discourse markers and connectives largely depend on the context in which they occur. Accordingly, in text understanding, discourse markers serve as clues for inferring the rhetorical or semantic structure of the text.

The notion of ‘text structure’ is highly emphasised, it “*refers to the ways text is organised to guide readers in identifying key information and making connections among ideas*” (Klingner et al, 2007:87). Similarly, the term ‘text structure’¹⁴ refers to the way ideas are structured to convey a message to a reader. Text structures can be depicted in the form of ‘graphic organisers’ to represent the interrelationships among ideas and patterns of text organisation. They can be *definition, classification, illustration, procedural description, and arguments*

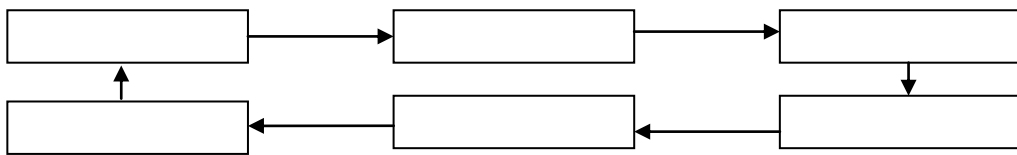
Graphic organisers have undertaken a variety of definitions. They are visual, hierarchical display of expository texts. They organise key conceptual relationships graphically and graphic representation of relationships of information (Jiang and Grabe, 2007). These graphic organisers typically present information as a semantic web or as an outline of main ideas in the text. Simply, they are “*visual representation of textual information and ideas*” (Klingner et al, 2007:152). A variety of names are used to refer to graphic organisers such as *framing, tree-diagramming, mapping, and flowcharting*. Each of these notions represents different ways of organising information and different degrees of details included in the graphic representation.

13 The term discourse markers is used for those lexical items that can signal the presence of a relation at the linguistic surface. The traditional distinction between content words and function words relies on the stipulation that the former have their "own" meaning independent of the context in which they are used, whereas the latter assume meaning only in context. Then, content words are assigned to the realm of the lexicon, whereas function words are treated as a part of grammar (Stede and Umbach).

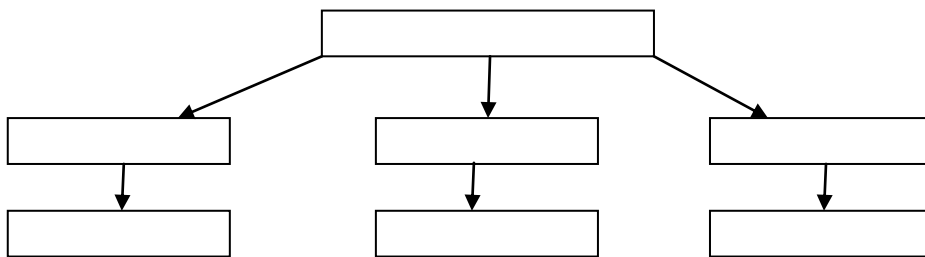
14 Other terms such as ‘discourse structure’, ‘discourse pattern’, ‘text type’, and ‘rhetorical organization’ are sometimes used interchangeably with text structure (Jiang and Grabe, 2007).

Visualisation techniques and graphic organisers help readers sort out relationships, make connections, and analyse information. They are seen as helpful ways in getting information because a good graphic representation can show the key parts of a whole and their relations, presenting a holistic understanding that words alone cannot convey (Jiang and Grabe, 2007). They are also needed for students of specialised discipline where they have to understand and attain the conveyed information. Indeed, graphic organisers assist students in organising the text they have read in a visual way, making its content more accessible for retention and immediate application to a specific academic task. For example, a text about ‘the water cycle’ can have a graphic organiser of ‘process and sequence’, however a text about ‘the functions of systems in the human body’ can have ‘description of hierarchy’, and text about ‘vitamins’¹⁵ can have a ‘classification’ (see the appendix C). The following graphic organisers give the general meaning of some texts.

1. Process and sequence



2. Description



3. Classification

Figure 1.3: Examples of graphic organisers reflecting text structures.

¹⁵ These are titles of texts from general science part one and two (Dudley-Evans and Bates, 1976).

1.4.3.6 Summarising and Note Taking:

When students read texts, they need to take notes and make summaries. Ultimately, a summary is made by “*choosing the main ideas from a text*” (Nation, 2009: 34). Students are required to generate main ideas from the text, then to combine them to form a summary. Such a strategy is more recommended for ESP learners. In many cases, they need to read a variety of texts for many reasons. So, they have to take a summary for every text they read to use them in their research and classroom tasks. Jordan (1997: 170) postulates that summarising is an important aspect of academic reading which students mostly need. The summary of text should contain only the most important ideas of the text. In addition to summarising, note taking can also be an effective way of understanding texts. It is considered as “*a necessary skill for later reference or revision purposes*” (ibid: 18). Therefore, note taking is one of the ways which shape summarising.

1.4.3.7 Using Cognates

Reading requires the mastery of vocabulary knowledge. One aspect can facilitate vocabulary decoding is that of cognates. Cognates are defined as “*words with similar spelling and meaning across languages*” (Bravo et al, 2005:15). Holmes and Ramos (1993) defined cognate as “*vocabulary exists when vocabulary items in two languages can be recognised by most users as being the same*” (quoted in Celce-Murcia & Olshtain, 2000: 93).

Due to their common ancestral connection with Latin, English and French share many cognates especially in the field of ‘science’. In this respect, some reading content areas specialists state that if the target language possesses a significant amount of cognate vocabulary, the task of vocabulary learning is less difficult. The situation of NLS students is that they are foreign language learners of French and ESP learners of English in which their familiarity with French is higher than English. Thus, they can rely on cognates because most of scientific terms are etymologically from Latin. Here are some examples

- | | | |
|--------------|--------------|-----------------|
| - adaptation | - inhibition | - parasites |
| - dilution | - structure | - virus |
| - locomotion | - variation | - precipitation |

– ventricle - digestion - membrane

However, students should be aware not to fall in the trap of false cognates. The latter “*are words with the same etymological origin but with different meaning*” (ibid). Although they may face some problems with false cognates, they still can get the necessary information since most of scientific vocabulary is the same in French and in English. This can be seen as one of the issues of language transfer.

1.4.3.8 Dictionary Use and Group Discussion

Vocabulary knowledge is an important component in reading comprehension. When students come upon a difficult word that they cannot infer from context, they can either ignore the word or consult a dictionary. Dictionary use is a strategy which is used to look for the meaning of unfamiliar word or to ensure more clearly the meaning of a given word. Hence, ESP students face some reading difficulties related to some unfamiliar vocabulary. In such a situation, students can use the strategy named selective dictionary use. It means to look up words that cannot be readily guessed from the context and that are either useful to learn or relevant to the main points of the passage or the task at hand (Prichard, 2008).

In the field of science areas, students need to maintain some basic words i.e. technical vocabulary. So, they can use dictionaries to gain the meaning of the specialised terminology. Moreover, it is more beneficial for students in content-area classrooms to use special dictionaries such as ‘the biology dictionary’ or the ‘chemistry dictionary’ or any specialised glossary to attain terminology related to their subject-discipline. In some cases, textbooks contain some special glossaries (with Arabic translation) at the end of the book to make it easy for students to learn and store the specialised vocabulary. From another perspective, students can also use group discussion to exchange information, correct misinterpretations, and evaluate information. Such a discussion contributes to more comprehension and retention.

1.5 Conclusion

Throughout this chapter, the researcher has reviewed the main theoretical aspects of ESP, reading, and reading strategies. Due to many factors, ESP students need to access to knowledge written in English. They need to read and understand specialised texts related to their content discipline. As a matter of fact, content schemata and linguistic schemata combine together to convey the meaning of the text. Although ESP students are well familiar with the content discipline knowledge, they face problems at the level of linguistic schemata. Difficulties in reading can be compensated by the effective use of reading strategies particularly that they read for some particular purposes. Hence, the primary aim of content areas students is reading for learning and getting content knowledge. Thus, they rely on reading strategies to meet their needs and purposes and solve the reading problems.

Chapter Two

Methodology Design

Chapter Two Methodology Design

2.1 Introduction:

The second chapter describes the research design and the methodological process of this study. The investigator chooses descriptive and analytical methods in order to conduct the research. The purpose of this inquiry concentrates on exploring the reading strategies used by NLS students to solve the reading problems. The context of study and the selected population are described contextualise the research.

It also describes the methodology used in order to gather and analyse data. As an attempt at answering the research questions, the chapter also provides a detailed description of the research tools. The interview and the questionnaire; how they are scheduled and compiled, to whom they are distributed, and how they are administered. It includes an outline of methods of measurement and the way data are processed and analysed.

2.2 Methodology:

Before dealing with methodological procedures and techniques, it is important to note that the designed methods must be congruent with the study aims and objectives. Thus, a research method is defined as “*a style of conducting research work which is determined by the nature of the problem*” (Singh, 2006: 99). It means that the incorporated methods have to reflect the general type of research questions. Moreover, Kothari (2004: 7-8) extends the notion of research methods where he distinguishes between research methods and research methodology

Research methods or techniques, thus, refer to the methods the researchers use in performing research operation... [However] research methodology is a way of systematically solve the research problem. It may be understood as a science of studying how research is done scientifically.

The above quotation indicates that it is necessary to know not only the research methods but also the methodology followed. The succeeding paragraphs include the rationale, explanation, and the relevancy of each selected method either at the level of data collection or data analysis. According to what has been discussed, the chosen methodology for the research design is mainly based on descriptive and analytical methods. The main purpose is describing the statistical scored data, comparing scores (frequencies and cumulative percents), and analysing results to evaluate the situation of using reading strategies in the context of reading subject discipline texts. The descriptive study aims at describing and analysing the learning context of English for specific purposes. In this respect, a descriptive research “*includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is the description of affairs as it exists at present*” (ibid: 2). An analysis of NLS students’ reading strategies can provide information about the way they interact with texts particularly that they are content schemata. To put it in a nutshell, all these issues are described statistically and analysed thoroughly to meet the formulated research questions which are set in the general introduction.

2.3 The Participants of the Study:

The setting of the current study is the Department of Biology at Amar Telidji Laghouat University. The chosen population are third year LMD students of 'Nature and Life Sciences', in French 'Sciences de la Nature et de la Vie'. This subject-discipline is the new form of the Biology branch in the LMD system. The study involves 29 students who are divided into two groups: plant ecology and animal ecology. Their ages range from 20 to 25. It is an abrupt occasion that all the participants are female.

The participants have come from two main secondary school branches which are 'experimental sciences' and 'math'. Thus, they are familiar with their content area since they are from scientific streams. The choice of the participants is based on their need to read English specialised texts. They are required to meet their needs. They show some interest to the ESP courses. In addition, they are taught 'English for science' since their first year by a teacher specialised in the biology and science field. It can be said that the teacher is somehow aware of the needs, purposes, and linguistic ability of his students.

The participants are assigned to read some texts which are relevant to their content area. The texts are mainly taken from a book entitled 'General Science' ¹(1976). The content of the book is related to English for Science and Technology (EST). In addition, extra texts are chosen by the teacher depending on the context of the course (some texts are from 'Biology: a Functional Approach' (1982)). The book, 'General Science', is adopted by the teacher as the main source for presenting lectures since it has the aspects of English use common to scientific disciplines. It has the aspects of teaching and learning science and biology in English. It includes texts, accompanying exercises, pictures, diagrams, and tables to explain information (see the appendix C).

1 The book is known as NUCLEUS, which is an integrated series for students who need English for specific purposes Witten by Tony Dudley-Evans and Martin Bates. The book is typically written for students of science and technology. It serves to equip EST students with the necessary linguistic knowledge in order to proceed. It is divided into parts part one 1 and part 2 and so on.

2.4 Research Variables

Before describing the research procedures, it is more appropriate to highlight the variables which the current inquiry is based on. In this respect, a definition of variable is provided, a variable is “*a property or characteristic which may differ from individual to individual or from a group to a group*” (Nunan, 1992: 232). In other words, it is an entity which takes on different values. The studied variables are: reading strategies use, purposes of reading and reading difficulties (subsequently linguistic inability). Other variables may intervene in the study such as age, subject discipline familiarity, attitudes and motivations. The dependent variable is the use of reading strategies whereas the independent variables are purposes of reading and reading difficulty, in addition to familiarity with subject discipline. The latter can be considered as a moderator variable that is a “*a special type of independent secondary variable selected for the study to determine if it affects the relationship between the primary independent variables and the dependent variable*” (Singh, 2006: 64). Thus, it is a variable or a factor which can be measured, manipulated or observed. It can be said that content area familiarity is chosen as a moderator variable since the population are familiar, to some great extent, with the content of science texts. This familiarity influences both purposes of reading and reading strategies. The following graph can depict the situation more clearly

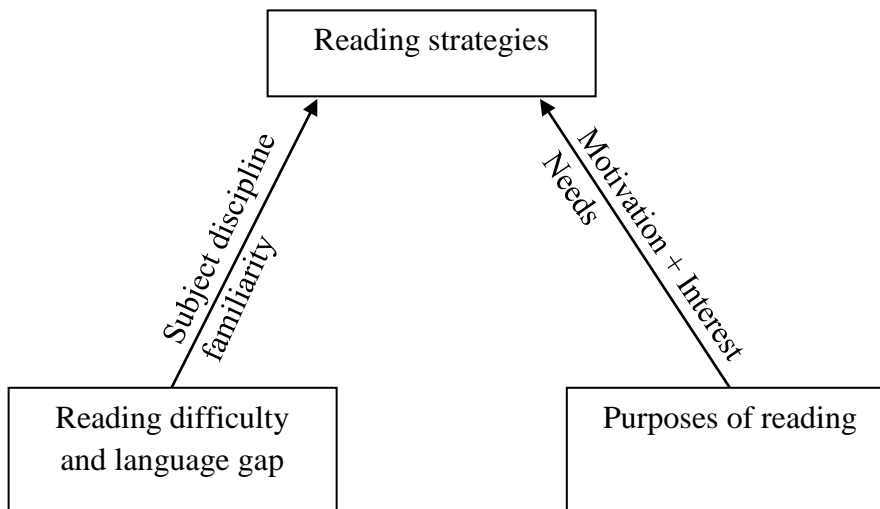


Figure 2.1: A depiction for the variables of the study

The figure clarifies the points which conduct and formulate the investigation. Moreover, it is not possible to study all the variables that the context may encompass. Therefore, some factors are cancelled such as age and gender. Locating the variables

and their types help to determine the research design and the way data are processed and analysed.

2.5 Research Instruments

For the purposes of the research, data come from two major sources. A structured interview is used to elicit information from two teachers who are the only available in the department. They are in charge of teaching ESP courses (English for science and technology) at the Department of Biology. The first is a specialised teacher who has studied biology subjects abroad in English. The second is a part-time general language teacher. He teaches ESP courses for Biochemistry and Agriculture students. The aim of the interview is to have a holistic and comprehensive picture about the teacher profile. It provides insights about the teaching situation of ESP courses. Having data and information about the teacher profile can help the researcher in analysing the students' questionnaire.

The questionnaire is designed for NLS students. It aims at gathering information about reading strategies used by NLS students to achieve their reading purposes and compensate for the reading difficulties. It serves to form an analysis of reading strategies to see the extent to which NSL students use them to solve the reading problems. To interview 29 students individually may take a long time and efforts. So, interviewing all students is time-consuming. However, the suitable tool is to administer a questionnaire particularly that the population are going to choose, categorise, rank, and determine the use or non use of reading strategies by answering 'yes' or 'no'. In addition, other questions require the respondents to choose the relevant answer. However, in others students are asked to categorise and rank the items from the most important to the least one.

Furthermore, to ensure the reliability and validity of the questionnaire, students are asked to fill the questionnaire in the presence of the researcher. This also helps the researcher to ensure that the population have understood how to answer in order to avoid any misunderstanding. Therefore, to answer the research questions, both qualitative data from the teachers' interview and quantitative data from the students' questionnaire are collected. Decisions are also made about the format of the

questionnaire and the type of the interview. The forthcoming paragraphs provide a detailed overview about the description and administration of each data collection tool.

2.5.1 The Description of the Interview

The aim of designing the interview is to obtain more data about the teaching situation. Further, the choice of the interview technique is prompted by the fact that it is possible to contact informants directly thanks to the small number of the respondents (only two teachers). Hence, the structured interview proves more information than the questionnaire. The current study of reading strategies is in the context of learning English for specific purposes. Thus, having information about the way students are taught can give more insights and data which may influence their motivation and attitudes not only towards learning English but also in reading it.

The interview is designed to cast light on the teaching context of ESP. The interview schedule comprises questions that aim to set the ground for the research. The questions range from general teaching issues to specialised ESP ones. They are about courses allotted time, teaching experience, ESP special training, the content of courses, difficulties and obstacles, reading specialised text, and reading strategies. A copy of the interview schedule is presented in the list of appendices. It is addressed to the two teachers who have taught English for students of science and biology. The former is a teacher (specialised teacher) who taught English for science to the chosen population (NLS students). The other is a part-time teacher (a general language teacher) who taught English for science to students of Biochemistry and Agriculture. Each teacher is interviewed individually. The aims of the interview are deeply explained to each teacher. The interview is enrolled during the second semester of the 2010-2011 academic year. The information gatherer, herself, asks the questions of the interview.

It is possible to interview only the specialised teacher since he teaches the population under study. But the investigator prefers to interview another teacher who also teaches English for science to see whether the two teachers are following the same teaching procedures. Their responses are based on their experiences and teaching status.

2.5.2 The Description of the Questionnaire

Before the administration of the questionnaire, the researcher attends with the population three sessions in order to explain to them the scope of the research and get

more insights about the context. She also elucidates the way students answer the questionnaire. The investigator administers 29 questionnaire papers to 29 students. It is scheduled during two class² sessions with the assistance of the specialised teacher.

The questionnaire is a compilation of three main sections. Each section has a significant role in the design of the questionnaire. The first two sections aim to show the connection between the background information, motivation, needs, purposes, and difficulties. The third part is about reading strategies. In other words, the first two parts deal with the independent variables and the third part deals with the dependent variable.

Section One: Background Information

The first part of the questionnaire comprises general information about the student's independent variables. It seeks general information about the students' age, gender, pre-university branch, current special field, and languages (French and English) proficiency. Having such information may help the researcher in analysing and discussing the results of the questionnaire.

Section Two: Motivation, Purposes, and Difficulties:

This part has eight (8) questions which aim to measure motivation, attitudes, needs, purposes, and reading difficulties which the chosen population face. The answers of the respondents can give a clear picture about the variables that may influence the use or non-use of a given reading strategy. The five first questions require the answer of 'yes' or 'no' whereas the three remaining questions require different category of answer.

The sixth question needs a rating frequency scale³. The respondent chooses the suitable classification in which she categorises the scale (always, sometimes, never). The seventh question is aimed at ranking the purposes of reading from the most

2 The questionnaire is administered in two sessions. One session for students of 'animal ecology' who are 15 students whereas another session is administered for students of 'plant ecology' who are 14 students

3 Rating scale: the rating scale involves the qualitative description of a limited number of aspects of thing or traits of a person. When using rating scales (or categorical scale), the respondent is going to judge an object in absolute terms against some specified criteria. This means that the respondent judges the properties of objects without reference to other similar objects. These rating may be "like-dislike", "agree, disagree", "above average, average, below average", or other classifications such as "always, sometimes, rarely, never", and so on. There is no specific rule whether to use two-point scale, three-point scales, or scale with still more points.

important to the least important. The eighth question is about the difficulties that students face during reading.

Section Three: Reading Strategies

The final part is the cornerstone of the research. It deals with reading strategies which the participants of the study use. It has five main questions. Each question comprises a set of sub-questions. The students are asked to indicate what represents their situation. In the first question, students are asked about the ways they use to get the general idea of the text, particularly that they are well familiar with the content schemata. The second requires students to answer reading strategies they use while reading. However, the third question deals with strategies used when students face a difficult paragraph. The fourth addresses the case of a difficult word and the strategies used to deal with it. The fifth question describes the strategies or steps that the participants use in order to ensure understanding of texts. In short, the respondents answer each question on the basis of its formulated structure.

2.6 Measurement Scales

The analysis and interpretation of data represent the application of deductive and inductive logic to the research process. The data are classified, described, and then analysed and synthesised in such a way that hypotheses can be verified or falsified (Singh, 2006: 222). The data are examined in terms of the general research framework. This means that the research methodology shapes to some extent the analysis of data. In this respect, measurements are relevant to the research design. There are some measurements and ways which can characterise and describe the gathered statistical data. Frequencies, percentile values, measurements of central tendency (mean, median and mode) are among the major descriptive tools that can be used to analyse data. Generally, *“tests yield the data in the form of scores and questionnaires provide the data in the form of frequency”* (ibid: 213). The responses of the questionnaire are presented in the form of frequencies and percentages, except for some questions. In this study, two main types of data are used for measurement purposes. The following is a description of the used scales in order to meet the final outcomes.

2.6.1 Nominal Scale

Both the interview and the questionnaire contain types of nominal data. In this context, nominal scale means “*the classification of an item into two or more categories without any extent or magnitude*” (ibid: 217). This means that nominal category is a set of ideas or objects which can be collectively grouped on the basis of shared characteristic. Among the possible types of categorisation is two possible outcomes such as ‘male’, ‘female’ and ‘yes’, ‘no’ questions.

Since the interview is a kind of qualitative data, it is regarded as tool to gather information about the learning situation. It can be noted that the way students are taught i.e. the teaching learning context can be seen as an independent variable which may influence the use of reading strategies (this variable is minimised). The interview is administered to get information about the teaching situation. Moreover, the design of the questionnaire is a compilation of questions which represent both independent variables and dependent variables. It includes questions of dichotomous choices as ‘yes’, ‘no’ questions, multiple choice questions, and ranking order.

Primarily, each question has an associated measurement scale. This implies that each question is based on some answer scale in which it serves for completing the analysis. For example, ‘yes’, ‘no’ questions accept the computation of mode i.e. counting the frequency of each ‘yes’ and ‘no’. Thus, the more frequently existed is the mode. The latter is defined to be “*the size of the variable or the score which occurs most frequently, it is the point that corresponds to the maximum frequency of the distribution*” (ibid: 291).

2.6.2 Ordinal Ranking Scale

The questionnaire is a set of different questions types which shape and convert research hypotheses into questions. In this connection, Richterich and Chancerel (1980) state that “*structured instruments for the collection of data translate research hypotheses into questions*” (cited in Zouaoui 1987: 23). Some questions require rank order scale. Ordinal measurements describe order, but not relative size or degree of difference between the items measured. This means that these questions are kind of ordinal data. The respondents are asked to order and rank the items from the most important reading purpose to the least important one. Numbers (1, 2, 3, 4, and 5) are assigned to items to represent the rank order. Hence, the most important purpose attributes (1), the second most important attributes (2) and so forth till the least

important purpose attributes (5). This means that there is a descending order i.e. the lower score is the high rank.

The general classification of ranking is calculated by the mode in order to see the high score. Questions of this type are entered in the SPSS system (version 13.0) in order to facilitate measurement and give exact data which need more analysis. Thus, the SPSS is an acronym for Statistical and Presentational System Software. It is more known as Statistical Package for Social Science. It is a computer program that provides tools for statistical analysis and data management. It performs a variety of descriptive and statistical techniques such as correlation coefficients, analysis of variance and multivariate relations.

2.7 Data Analysis and Processing

Analysis of data means studying the tools designed for the research. Processing implies coding, classifying, and tabulation of the collected data so they can be amenable to analysis. The term analysis means “*the computation of certain indices or measures along with searching for patterns of relationship that exist among data*” (Kothari, 2004:130). The current study has a descriptive and analytic nature. It means that the research tools (interview and questionnaire) are analysed and interpreted to meet and synthesise the final outcomes. The way data are analysed is determined by the nature of the instrument. Thus, the interview is processed and analysed qualitatively. The questionnaire is analysed quantitatively. Each question is analysed in accordance to its structure.

Some questions in the questionnaire are examined and coded for statistical analysis to answer the research questions listed at the beginning of the study. The SPSS 13.0 was employed for the statistical analysis of data and the significance level of $p. < 0.05$ was set. The latter formulae means that there is a relationship between the variables (reading purposes and reading strategies) where P is the value calculated by the SPSS to emphasise whether there is a kind of relationship between variables. But if the results show that $p. > 0.05$, this means that there is no relationship between the aforementioned variables. The results are provided by SPSS 13.0 in which the level of confidence is 95%. For example, in the question of reading difficulties, students are asked to mark the difficulties they face during reading. They are asked to indicate ‘yes’ or ‘no’ for each

category of problem. In order to facilitate data processing in the SPSS, the researcher attributes codes to the possible answer: ‘yes’ is coded as (1) and ‘no’ is coded as (2). This means that (1) indicates that there is a difficulty, however (2) stands for no difficulty.

Since the mean is meaningless in both nominal and ordinal data, it is computed when dealing with scores (in case of different numerical values). The more applicable measurement is frequency represented in the form of mode. The mean is “*the sum of all the values of the items in a series divided by the number of the items, it is designed by the symbol M* ” (Singh, 2006: 286). However, the mode is defined to be “*the variable or the score which occurs most frequently. It is the point that corresponds to the maximum frequency*” (ibid: 291). Most of the questions in the questionnaire are measured by the mode in which the researcher counts the frequently occurring value. To avoid any kind of misinterpretation, the SPSS provides a table for measuring the number of answers, frequency stands for the number of the respondents either for ‘yes’ or ‘no’. Each frequency is summated in percentage form to facilitate comparison (percentages are compared in terms of the large proportion in order to determine the mainly used strategies).

Further, in pursuit for the accomplishment of data analysis, correlation coefficient is established to prove whether any relationship exists between reading purposes and the most used strategies. In this connection, a correlation is a single number that describes the degree of relationship between two or more variables. In other words, Correlation coefficient “*is a simple statistical measure of relationship between one dependent and one or more than one independent variables*” (Bolboacă, Jäntschi, 2006). The two variables reading strategies and reading purposes are ranked in terms of use and importance respectively. To measure such a relationship, Spearman coefficient correlation is the most appropriate. The latter is “*a technique for determining the degree of correlation between two variables in case of ordinal data where ranks are given to the different values of the variables*” (Kothari, 2004:139). In addition, it is non-parametric⁴ measurement designed to measure relationship between paired data in the rank order form of two variables. Frequently, the Greek letter ρ (rho) is used to abbreviate the Spearman correlation coefficient.

⁴ Non-parametric tests are used when data are expressed in terms of nominal and ordinal measures (Singh, 2006: 238)

$$\text{Spearman coefficient correlation } \rho \text{ (rho)} = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

d = is difference between ranks of each pair of the two variables

n = number of pairs

The measured number is ranged from -1 to +1. For example, if the measured number is 0.7, it means that a strong relationship exist between the two variables but if the value is -0.5 this indicates that the relationship is weak. The researcher aims to find the extent to which there is a relationship between reading purposes and the most applied reading strategies.

2.8 Conclusion:

In this chapter, the researcher has provided an outline for the research methodology adopted in the present study. At first, the methodology is described in which both descriptive and analytic methods are chosen for the study design. The reasons for using both methods are also explained. The participants are described to set up a ground basis for the research. Instruments used in the study included two types: an interview for teachers and a questionnaire for the chosen population are also discussed. The obtained results are analysed quantitatively and qualitatively. Two main measurement scales are chosen: the nominal scale and ordinal scale. In addition, the variables on which the current study is based on are also demonstrated. The analysis of the gathered data and the interpretation of findings and results are presented in the next chapter.

Chapter Three

Findings and Results Analyses

Chapter Three

Findings and Results Analyses

3.1 Introduction

In this chapter, the researcher examines, analyses, and discusses the data attempting to find out the extent to which the proposed hypotheses are tangible to the context of the chosen population. In other words, the obtained results from the administered tools (the interview and the questionnaire) are studied thoroughly. It tests the hypotheses stated in the general introduction. On the other hand, the results and findings of the questionnaire aim to check the extent to which NLS students use reading strategies to solve the problems encountered during reading, analysing the factors and variables behind the frequency use of a given reading strategy. To answer the research questions and corroborate hypotheses, the study is based on descriptive and explanatory methods. The results are analysed qualitatively and quantitatively with statistical perspectives.

3.2 The Analysis of the Teachers' Interview

Each question in the interview is presented individually in order to be studied and analysed thoroughly. The obtained data from the structured interview can help in describing the context and it paves the way for the questionnaire analysis.

Item 1: Special training in teaching ESP courses

When the teachers are asked whether they have received a special training to teach ESP courses for science (English for science and Technology), the two teachers answered according to their formal training in learning. The general language teacher has not received any special training on how to teach ESP courses and the linguistic items to focus on. However, he has received purely literary and academic general language training. The specialised teacher received some kind of training not on how to teach ESP courses but on learning science and biology knowledge since he got the occasion to study abroad in England. Thus, he exploited his abilities and competences in teaching ESP courses. The advantage of learning science in English makes him to some extent aware of the necessities of teaching ESP courses.

	Special training in ESP courses
The ESP teacher	Studied biology and science knowledge in English.
The general language teacher	No

Table 3.1: Special training in ESP courses

Therefore, the two teachers are not trained to teach ESP courses, except that the specialised teacher studied biology subject discipline in English. In fact, teachers of English have not had a scientific knowledge while they are asked to teach ESP courses. Some of them are not even aware of the nature of the ESP courses, not as experts in the field, but as communication teachers dealing with students who do not value the language as an object of study per se, but seek competence in English to be functional in their own academic science discipline.

Item 2: The content of the course

	The content of the course
The specialised teacher	Science and biology items (vocabulary, texts and exercises)
The general language teacher	General knowledge of English, some science vocabulary, grammar rules, and phonetics

Table 3.2: The content of courses

Each teacher teaches the way which suits him. This is due to the absence of clearly defined syllabus for teaching English to students of ‘Nature and Life Sciences’ or any other science stream. The teachers choose only what is compatible to them without taking into consideration the students’ attitudes, motivation, linguistic levels and abilities with some reservation to the situation of the specialised teacher.

Item 3: Cooperation between language teacher and subject specialist

	Cooperation between language teacher and subject specialist
The specialised teacher	No
The general language teacher	No

Table 3.3: Cooperation between language teacher and subject specialist

As the table 3.3 shows, there is no kind of cooperation between the language teacher and the subject specialist. When the general English teacher is asked about any kind of cooperation, he reported that he teaches grammar, phonetics, and only some science vocabulary. Thus, he has not asked for any kind of cooperation. An important question in ESP teaching lies in the following: can one teach the language of specialisation without being familiar with its subject matter and concepts? In fact, one cannot reasonably expect the language teacher to master all the thought processes and concepts of science and biology field. In this context that cooperation is favoured. On the other hand, the specialised teacher answered that he teaches the items related to students' specialisation i.e. all what is related to science and biology. It can be noted that the latter teacher is aware of the situation. He stated "*English becomes necessary for science knowledge, it is the language of science*". In brief, there is some sort of communication and cooperation gap, although one of the characteristics of the ESP teacher is a collaborator (according to Dudley-Evans and ST John, 1998).

Item 4: What kinds of texts you prepare for the students?

The chosen texts for reading differ from one teacher to another. The selection depends on some criteria particularly the learning context. The specialised teacher noted that he chooses and prepares texts according to the subject of the course. For example, he stated that "*in the lesson entitled function and ability the chosen text for reading is a text about the functions of the systems in the human body and so on for each session*" (see the appendix C: texts samples). In this respect, he designed texts from 'General

Science Part (1) and Part (2)¹ (Dudley-Evans & Bates, 1976) in addition to some chosen texts from 'Biology: a Functional Approach' (Roberts, 1982). The texts are planned according to the lessons' topic. However, the general language teacher answered that he chooses general texts from electronic sites. They are about general issues such as 'global warming', 'man and life', etc. So, the selection of texts is somehow different, it depends on the teachers' speciality, knowledge in the subject discipline, and awareness of the needs and purposes of students.

Item 5: The nature of science vocabulary

The teachers admitted that science vocabulary is complex and special. The general language teacher noted that science vocabulary is very complex and needs to be taught before to be attained whether to the teacher or the students. The specialised teacher indicated that some English science vocabulary is the same in French and in English i.e. cognates. Thus, it can be seen as a facilitating factor for students who are familiar with French since it is the language of instruction.

Item 6: The difficulties that you face during the reading session

Both teachers note that they face some difficulties during the reading session. The problems are related to some special factors. Among them, some students show their disinterest to read texts. In addition, some texts contain very complicated vocabulary which students are not familiar with. In the same context, they also noted that the reading session requires more time in order to read, explain the important ideas, and complete the reading tasks.

Item 7: Can students read and understand English specialised texts?

The two teachers are asked about reading ability and the level of understanding texts of specialisation. The specialised teacher noted that reading ability varies from one student to another. Some can function well in reading and understanding science texts than others. This refers to the individual differences of students specially abilities, attitudes and so forth. In general, students can read and achieve their reading purposes.

¹ As it is stated before the NUCLEUS series are taken by the teacher to be the students' textbook. They contain 'common core' and 'subject specific' items; grammar rules, vocabulary, texts, exercises.....

This can be shown when they are given questions related to the text and they are assigned to answer the questions. At this stage, one can deduce that they can read and understand the text, or at least they can answer their reading purposes and needs. On the other hand, the general language teacher noted that reading abilities are not the same. Each student has some abilities and strategies which reading comprehension.

Item 8: Do you follow any direct explicit instruction of reading strategies?

The specialised teacher indicated that he does not follow any direct explicit instruction of reading strategies. He just follow some kind of activities related to brainstorming and activating background knowledge before reading the text, asking some questions to test comprehension, and sometimes shaping diagrams to picture and explain the text form particularly if *“the text is about the description of a process, manipulation of system and so on”*. The teacher provided an example of forming a graph (graphic organiser) with the students about the cycle of water (see it in the appendix C). He also noted *“sometimes I give them a diagram and I ask them to complete it on the basis of the information of the text”*. On the other side, the general language teacher provided his students with a list of explained vocabulary. He asked questions about the text and finally he wrote the main ideas on the blackboard. One can deduce that both teachers pursue some tasks to facilitate reading comprehension courses.

3.3 Result Analysis of the Questionnaire

At this stage, the analysis and interpretation of data is pursued for the parts of the questionnaire for the sake of reaching the final outcomes of the study.

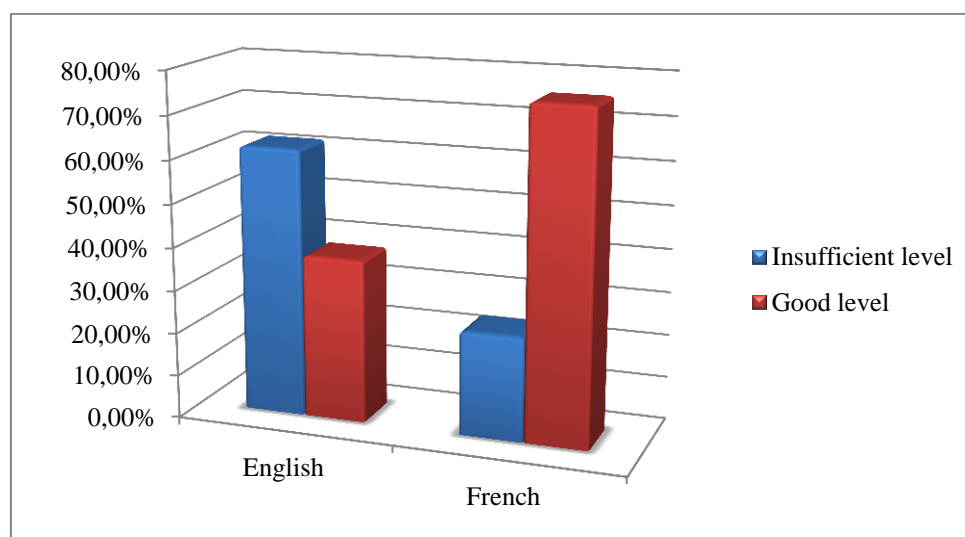
3.3.1 Section One: Background Information

As stated earlier, this introductory phase seeks to cast light on the general situation of the population. According to data, the average of age ranges between 20 and 25. The 29 respondents are all female. They come from two pre-university branches which are ‘experiment sciences’ and ‘math’. 24 students (82.75 %) were students of ‘experimental sciences’ whereas 5 students (17.24 %) were students of ‘math’. The students are divided into two sub-disciplines: 14 students are specialised in ‘plant ecology’ and 15

students in ‘animal ecology’. Moreover, the students’ proficiency in both languages French and English varies from one student to another. The following table (3.9) shows the percentage of the two languages’ proficiency.

	Insufficient level	Good level
English	62.07%	37.93%
French	24.14%	75.86 %

Table 3.4: The level of students in English and French



Graph 3.1: The level of students in English and French

The percentages provided by data indicate that the levels of language proficiency in both English and French are different. (62.07%) of NLS students show their insufficient level of English. The result is due to the fact that all the modules of instruction are taught in French except for the English module. Thus, English is not the language of instruction. However, (37.93%) show that they have a good level in English. It can refer to previous good attitudes and motivation towards English. Moreover, the majority of NLS students (75.86%) have a good level in French. This is an expected result since it is the language of instruction.

3.3.2 Section Two: Motivation, Purposes, and Difficulties

In order to have a clear picture, a set of questions intend to quantify the students attitudes, motivation, difficulties, needs and purposes towards English and specifically reading scientific texts related to NLS content area.

Question One

The majority of students (62.06%) indicate the necessity of having an English module. The result reflects what the investigator has pointed before concerning the need to read and understand science texts which are mostly available in English. It also shows that NLS students are aware of the requirement for such module. However, the remaining students (37.94%) show that it is not necessary to have an English module. The rate implies their negative attitude and motivation towards English. This may be due to a lack of English proficiency.

	Numbers	Percentage %
Yes	18	62.06%
No	11	37.94%
Total	29	100%

Table 3.5: The necessity of the English session

Question Two

The below reported data, in the table 3.6, show that most of students (72.41%) find the reading sessions interesting and relevant to their subject discipline. This is clearly stated by the specialised teacher (in the interview) who chooses the texts for reading. The reading sessions are devised on the basis of their relevance to the subject of the course. Having such a result indicates that NLS students are reading texts related to their subject discipline. The matter that can increase their motivation and attitudes towards reading in spite of the difficulties they may face. On the other hand, only eight students (27.59%) have answered 'no'. This may refer to the students' unwillingness to have an English module, due to their insufficient linguistic level.

	Numbers	Percentage %
Yes	21	72.41%
No	8	27.59%
Total	29	100%

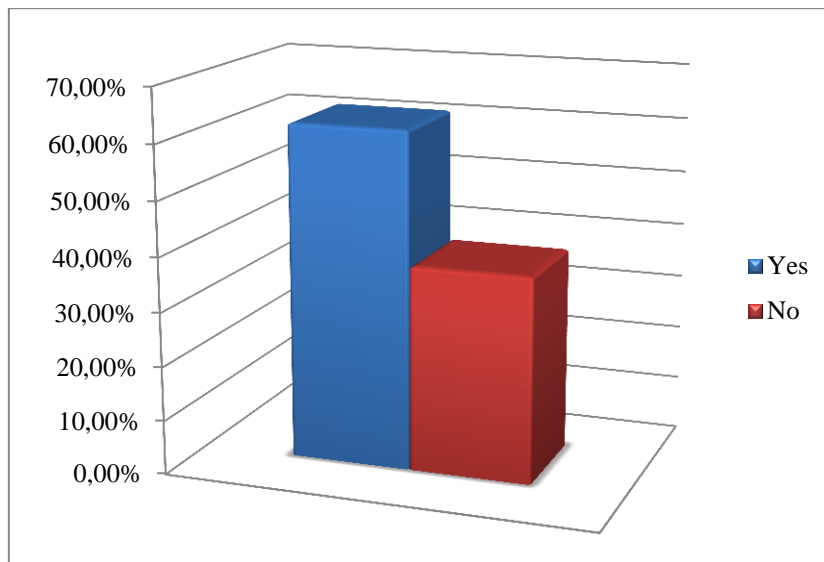
Table 3.6: Reading sessions interest

Question Three

The data, underneath, indicate that (62.06%) of students consider reading English specialised texts very important.

	Numbers	Percentage %
Yes	18	62.06%
No	11	37.93%
Total	29	100%

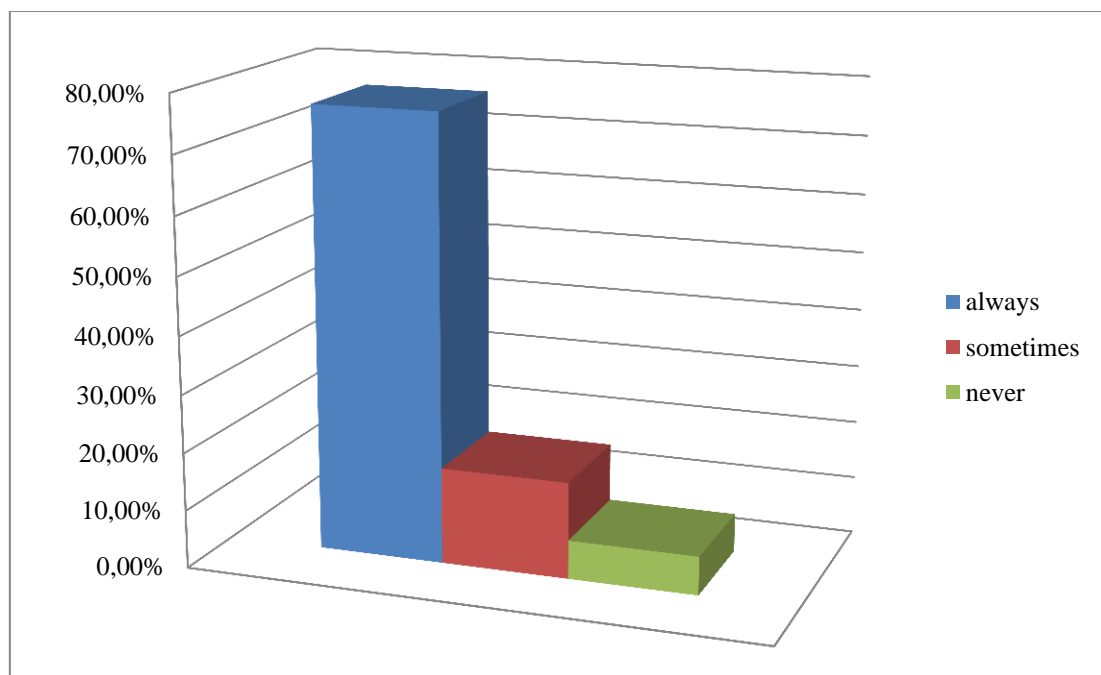
Table 3.7: The necessity of reading English science texts



Graph 3.2: The necessity of reading English science texts

The high rate explains the necessity to read specialised texts since it is the only choice for the insufficient French resources. Most of scientific books and articles are published in English. In this sense, Wood (2001: 71) states that “*English plays an increasingly prominent role in scientific publication round the world*”. The main aim for NLS students is ‘reading to learn’ due to a lack of Arabic and French documentations. In this connection, reading specialised texts helps students develop, to some extent, scientific literacy². However, (37.93%) show that it is not very necessary to read specialised texts. The responses may imply other ways for gaining knowledge and information and not necessary to read specialised texts such as looking for a translation to the text.

Question Four



Graph 3.3: The students’ frequency of purposes of reading

The graph 3.3 shows that the majority of NLS students (76.66%) always base their reading of specialised texts on purposes. This means that they read whenever they have a purpose. In other words, reading content areas texts is basically a purposeful activity. The main purposes for reading can be reading for specific information, or getting a general idea about the text, for example extracting information about plant

² In this context, scientific literacy means the ability to read and write science texts and to be familiar with conventionalised English science aspects

diseases or animal behaviour. They may also read to answer questions or to complete a diagram or do an exercise. Thus, the purposes vary from one situation to another. Moreover, (16.66%) of the students answered that they sometimes based their reading on purpose. It may mean that these students read only for the sake of reading in addition to reading for learning or they want to improve their scientific literacy. However, only two students (6.67%) never based their reading on purposes. This means either they do not read or they just read without any purposes. The feedback from this question is that NLS students read mainly to achieve their purposes i.e. highly purpose-based.

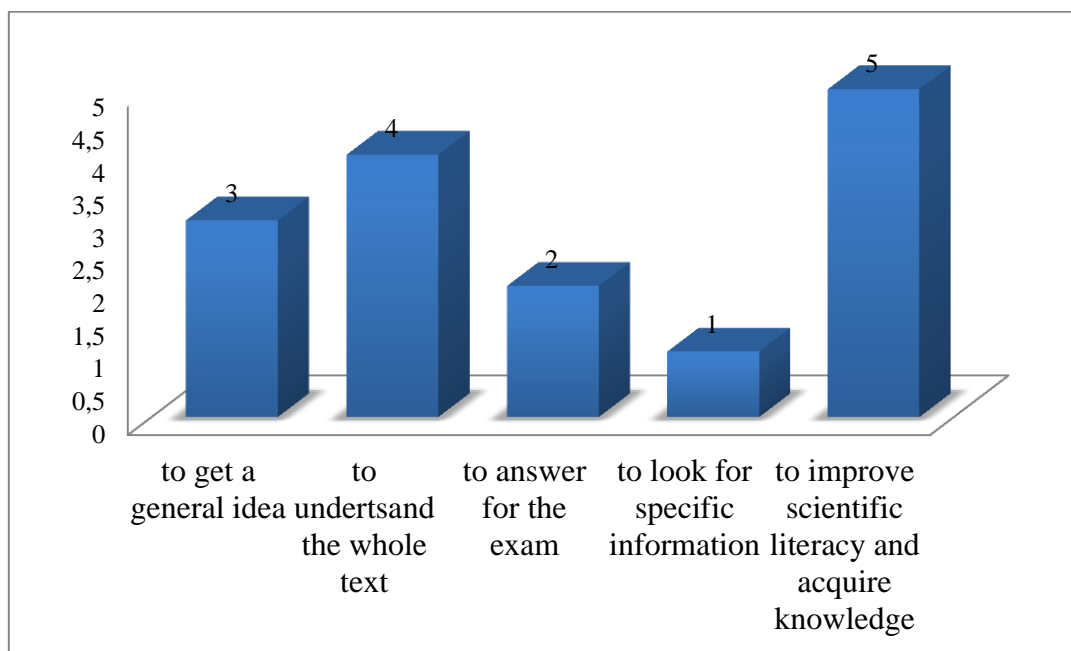
Question Five

In this question, students are asked to rank their reading purposes from the most important to the least one. The following table shows the results. This question is calculated by the SPSS 13.0 in order to measure the rank of each purpose, particularly measuring the *mode since it is appropriate for ordinal measurement*, although the SPSS system gives all the possible measurements of central tendency³.

		to get a general idea about the text	to understand the whole text	to answer for the exam	to look for specific information	to improve scientific literacy and knowledge
N	Valid	29	29	29	29	29
	Missing	0	0	0	0	0
Mean		2.62	3.66	1.97	1.76	5.00
Median		3	4	2	2	5
Mode		3	4	2	1	5
Variance		1.172	.520	.534	.690	.000
Sum		76	106	57	51	145
Ranking		3	4	2	1	5

Table 3.8: the ranking of reading purposes

³ Measurements of central tendency are: mean, median, and mode.



Graph 3.4: Ranking of reading purposes

On the basis of the above data, NLS students have arranged and ranked their purposes of reading from the most important to the least important. The first rank is for reading ‘to look for specific information’. The main purpose of reading is to locate specific information in order to interact in given activity such as: to answer a question and fulfil a scientific research particularly when looking for information available only in English publication. The second rank is reading ‘to answer for the exam’. It is an expected result since NLS students have exams. Thus, they have to read and learn information in order to answer the exam questions. The third rank is reading ‘to get a general idea about the text’. They have texts in the reading sessions. They have to know the idea of texts to communicate with the teacher and colleagues and answer questions or complete a diagram if any. The fourth is reading ‘to understand the whole text’. NLS students read to understand the whole texts only in some situations particularly when the text is about a scientific experiment which they need to understand each step to pursue it. The fifth is reading ‘to improve scientific literacy and acquire more knowledge’. All the students mark this purpose of reading as the last purpose. It means that students rank only the first, second, third and the fourth while the fifth is remained the last. This may also imply that improving scientific literacy is seen as final outcome for the aforementioned purposes.

To put it in a nutshell, the ranking of purposes indicate that NLS students' reading purposes depend on different situations. Each student has her own purposes but the main purposes are: reading to look for specific information, reading to answer the exam, and reading to get the general idea. Therefore, purposes of reading play an important role in the selection of reading strategies.

Question Six

This question addresses the difficulties which NLS students encounter when reading specialised texts. It is measured by the SPSS in order to facilitate analysis and interpretation (as indicated in the methodology design 1= yes and 2= no to avoid any kind of misinterpretation).

	Specialised vocabulary	Complicated and long sentences	General vocabulary	Unfamiliarity with the text's content and context
Number	29	29	29	29
Mean	1.55	1.24	1.41	1.69
Median	2	1	1	2
Mode	(no) 2	(yes)1	(yes) 1	(no) 2
Sum	45	36	41	49

Table 3.9: Reading difficulties

The analysis of table 3.9 shows that general vocabulary and complicated long sentences (syntax and grammar aspects) are the main difficulties which encounter students in reading texts. However, specialised vocabulary and unfamiliarity are less encountered problems. Thus, the following tables summarise the results of each aspect of difficulty.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	13	44.8	44.8	44.8
2 (no)	19	55.2	55.2	100.0
Total	29	100.0	100.0	

Table 3.10: Specialised vocabulary difficulty

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	22	75.9	75.9	75.9
2 (no)	7	24.1	24.1	100.0
Total	29	100.0	100.0	

Table 3.11: Complicated and long sentences difficulty

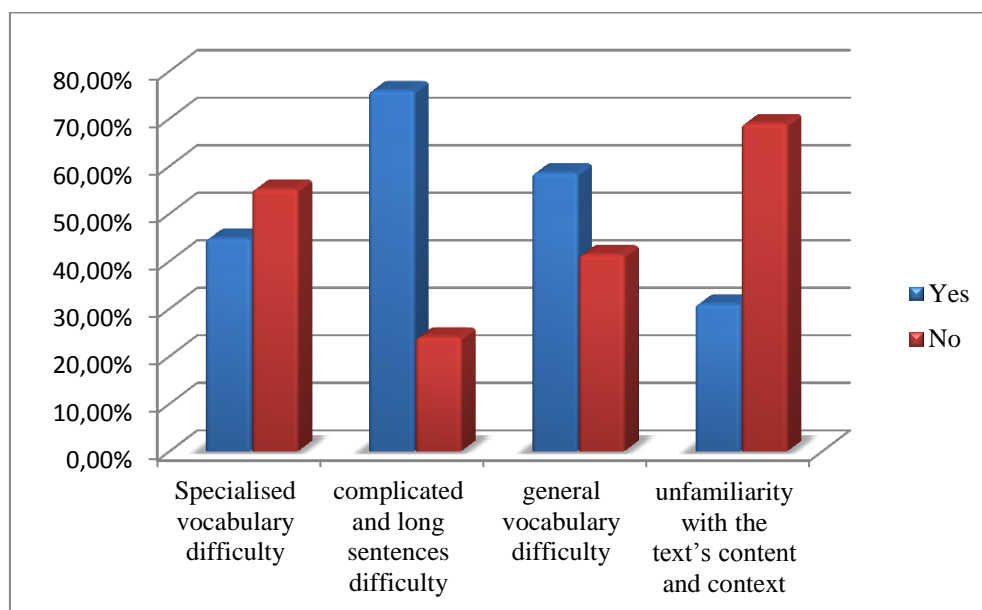
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1(yes)	17	58.6	58.6	58.6
2 (no)	12	41.4	41.4	100.0
Total	29	100.0	100.0	

Table 3.12: General vocabulary difficulty

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1(yes)	9	31.0	31.0	31.0
2(no)	20	69.0	69.0	100.0
Total	29	100.0	100.0	

Table 3.13: Unfamiliarity with the text's content and context

The results of the above tables are summarised in the below bar-graph to facilitate the analysis of the obtained data, especially by comparing cumulative percents.



Graph 3.5: Reading difficulties

It can be noted that reading difficulties vary at the level of vocabulary, sentence structure, and familiarity with the content and context of the text. According to the cumulative percents, the main problems are the ones related complicated and long sentences (the morpho-syntactic level) and general vocabulary in comparison to difficulties of specialised vocabulary and unfamiliarity with the content of the text. A large proportion of students (75.9%) indicate the issue of understanding and relating long sentence. This problem refers to the inability to master syntax and grammar rules. It can be classified in the frame of lacking the basic linguistic schemata. Another factor may also provoke a difficulty is the nature of scientific texts since they are condense and convey highly-interrelated knowledge.

Moreover, general vocabulary is also considered as an obstacle for some NLS students (58.6%). The problem of vocabulary can be related to the fact that these students do not have any space in order to practise and learn general academic vocabulary. The allotted time for the course is not enough to build the appropriate linguistic ability. In addition, specialised vocabulary provokes also a difficulty for a group of students, but with a less cumulative percent (44.8%) than the above two problems. Significantly, one of the typical properties of scientific texts is the specific scientific terminology. These students cannot handle such type of terms though they are

familiar with some terms which are the same as in French (cognates), but they still need to enlarge their scope of learning specialised vocabulary.

Lastly, NLS students are familiar with the content of some texts taught before or related to information mastered before (in their French instruction modules). When the topic of the text is not tackled before, reading problems can be emerged. This sometimes happens when students are looking for information to do research and experiments. Unfamiliarity with the content and context of the text causes also a difficulty for some students but with a less cumulative percent (31%) than all the aforementioned ones. Reading problems can be avoided by handling both specialised and general vocabulary in addition to the use of the relevant reading strategies in order to overcome reading gaps and achieve purposes of reading. The effective use of strategies depends on some factors such as the purpose of reading, context, and difficulties. Hence, among the main variables which influence the use of reading strategies is language gap, subsequently reading inability and difficulty.

3.3.3 Section Three: Reading Strategies

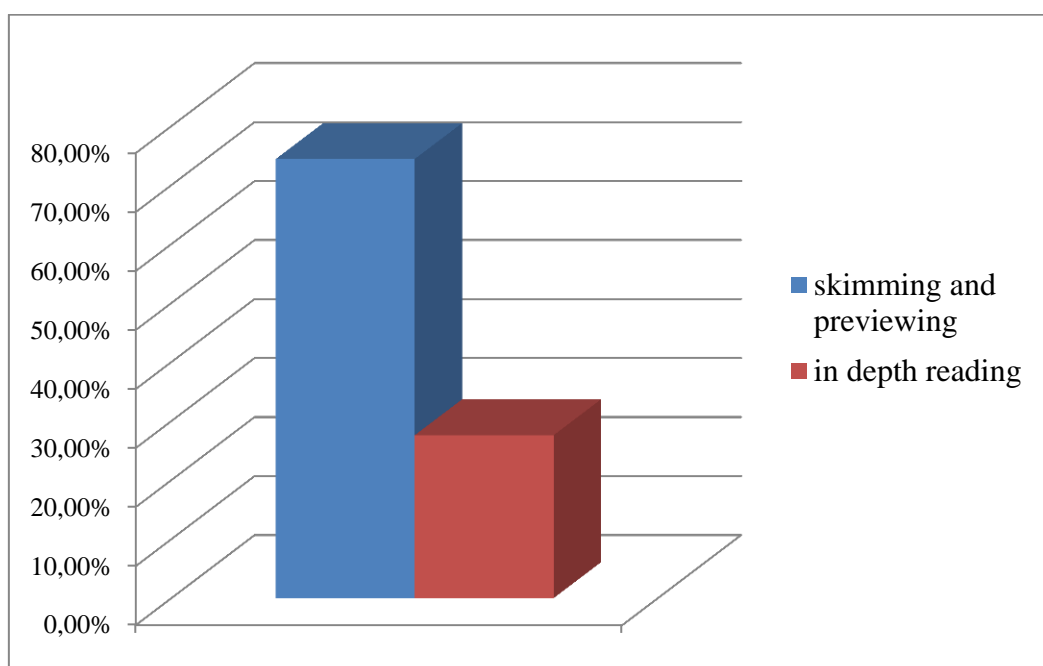
As mentioned before, this part of the questionnaire seeks to quantify reading strategies NLS students use in order to achieve their purposes and compensate for the lack of linguistic schemata.

Question One

This question deals with the ways NLS students use in order to get the general idea of the text. The majority of NLS students (72.41%) use skimming and previewing techniques to obtain the gist of the text. The result reflects the students' reliance on key words, visual clues in the text such as pictures, graphs, and the general form of the text (how the text is organised and structured). Explicitly, the major purpose of these students is to get the general idea of the text. Further, looking for the main idea is not always the desired aim. In some situations, it is needed to locate specific information from the text or understand the whole text particularly when it comes to conducting experiments.

	Number	Percentage
Skimming and previewing	21	72.41%
Reading the whole text (in depth reading)	8	27.59%
Total	29	100%

Table 3.14: Ways of processing texts



Graph 3.6: Ways of processing texts

As can be seen from table 3.14 and graph 3.6, only 8 students (27.59%) read the whole text thoroughly in order to get the main idea. It can be noted that these students have good attitudes towards reading in general (either in L1 or any other foreign language). They want to develop their abilities in reading scientific texts to understand all the information in the text. Some science texts, which contain detailed procedural description, require the mastering of each aspect such as: *cell division, metabolism aspects, and functions of the mammalian liver*. These are some examples in which students need to understand each step or process.

Question Two

Content area reading is based on familiarity with subject discipline knowledge. The second question tackles reading strategies used when reading science texts. The following tables show the rates of the use of each reading strategy.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	22	75.9	75.9	75.9
2 (no)	7	24.1	24.1	100.0
Total	29	100.0	100.0	

Table 3.15: Predicting and activating background knowledge

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	29	100.0	100.0	100.0
2 (no)	0	0	0	0
Total	29	100.0	100.0	

Table 3.16: Surveying visual aids

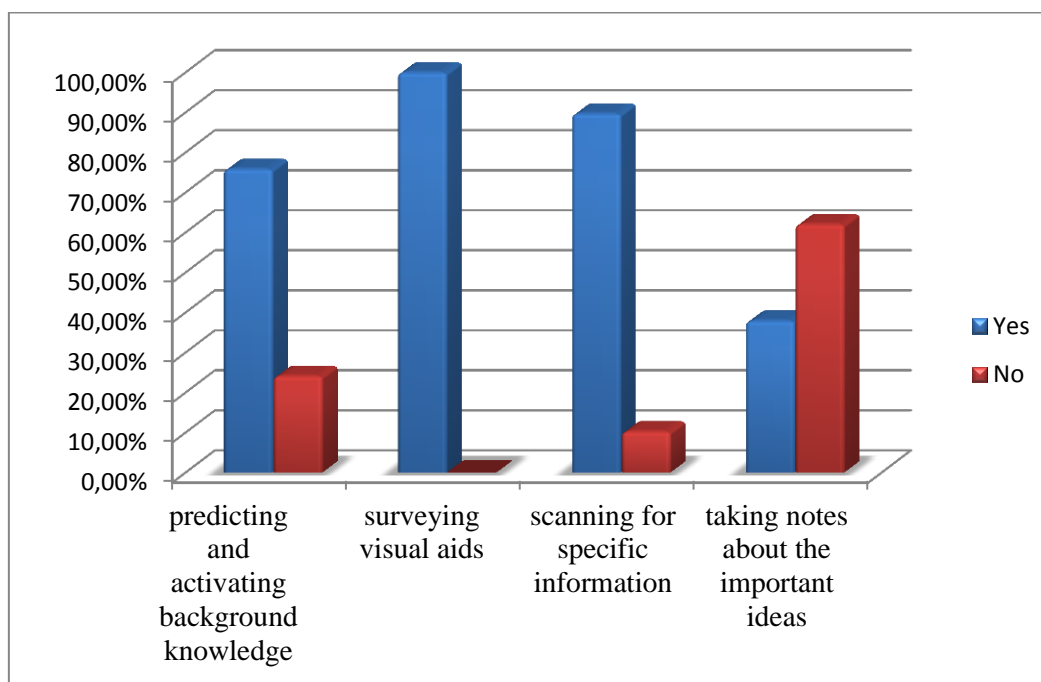
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	26	89.7	89.7	89.7
2 (no)	3	10.3	10.3	100.0
Total	29	100.0	100.0	

Table 3.17: Scanning for specific information

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	10	34.5	34.5	34.5
2 (no)	19	65.5	65.5	100.0
Total	29	100.0	100.0	

Table 3.18: Taking notes about the important ideas

On the basis of the cumulative percents, surveying visual aids (pictorial support) gets the most percentage (100%) in comparison with the other strategies: predicting and activating background knowledge, scanning for specific information, and note taking. The results are summarised in the following bar-graph



Graph 3.7: Strategies used when reading science texts

Indeed, NLS students rely mostly on the available visual representations (pictures, formulae, and charts) since they convey clear information. Surveying these visual non-linguistic data gives students at glance a holistic image about the content of the text. They constitute an explanatory technique often used in scientific texts. The function of non-verbal modes of communication is complementary to the text's overall meaning. This technique helps the student to transfer the content of the picture or chart in order to relate it to the whole process of text's comprehension. One can note that this strategy is done unconsciously since a picture, a figure, or any other form attracts the student when reading texts. Thus, it is a simple, iconic, and easy way to get at least an idea about the text.

Reading in subject areas is basically 'reading for learning'. Moreover, a large proportion of students, as stated before in the reading purposes, indicated that among the purposes for reading is 'to look for specific information'. In this connection, scanning also receives a high use with percentage of (89.7%). NLS students need scanning when they do research since they have to read some texts to locate a given information. In addition, scanning is also used when students are asked to answer questions related to the text (comprehension questions).

Further, prediction and activation of content schemata are highly used but with less cumulative percent (75.9%) if compared with surveying visual aids and scanning for specific information. NLS students form predictions that are relevant to the content of the text. They try to recall all what they know about the topic. Thus, in a way or another, they bring what they know to what they want to learn from the text (the KWL strategy). In other words, they draw upon prior knowledge, schema-experience about topics to facilitate comprehension. They connect new knowledge with what is already known. Students appear to be recycling previous knowledge in order to be used in its suitable context. NLS students store information in a different set of clusters, for example: *life cycles of organisms, plant ecology and environment, properties of rocks and minerals*. On the basis of the clues found in the text, students use the stored knowledge. On the other hand, the remaining students (24.1%) do not use such strategy. This may refer to their inability to find the suitable clues.

As far as reading for learning is concerned, it is necessary to take some notes in order to recall the main ideas and information. This strategy has received minimal use in comparison with the aforementioned ones. (34.5%) of the whole population take notes when reading science texts. They locate specific information and write them in the form of short notes. Subsequently, they take notes when they read long texts or articles which they need in their topics of research. Taking notes help them extract the relevant information. The remaining students (65.5%) indicate that they do not use note-taking strategy. This may be interpreted in the fact that they cannot differentiate between main ideas and details. Another factor affecting the result is the students' learning styles. Note taking is a learning style which not all students tend to use. Hence, it requires the student to disclose the major information which linguistic structures convey.

Question Three

Students are asked to pick the strategies used when they encounter a difficult paragraph. The following tables show the percentage of each used strategy. The large cumulative percentage is considered as the most used strategy.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	16	55.2	55.2	55.2
2 (no)	13	44.8	44.8	100.0
Total	29	100.0	100.0	

Table 3.19: Rereading and regulation of speed

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	4	13.8	13.8	13.8
2 (no)	25	86.2	86.2	100.0
Total	29	100.0	100.0	

Table 3.20: Using connectives and discourse markers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	14	48.3	48.3	48.3
2 (no)	15	51.7	51.7	100.0
Total	29	100.0	100.0	

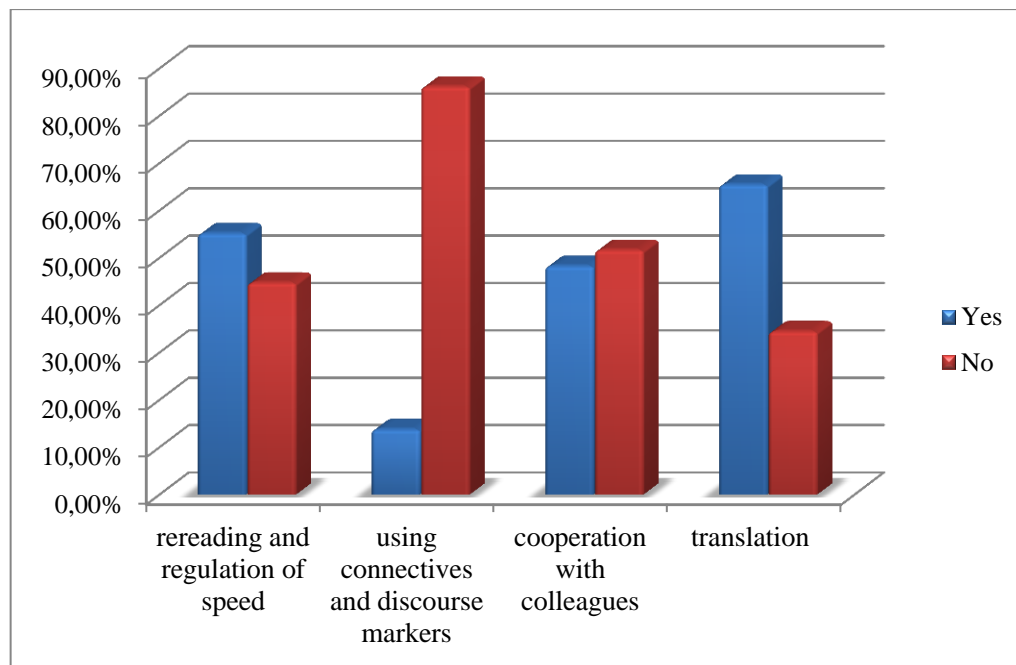
Table 3.21: Cooperation with colleagues

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	19	65.5	65.5	65.5
2 (no)	10	34.5	34.5	100.0
Total	29	100.0	100.0	

Table 3.22: Translation technique

As can be noticed from the above data, the most used strategy is translation with a high cumulative percent (65.5%) in comparison to the other above strategies (in question three). 19 participants indicate the use of translation whenever they face a difficulty. This result implies the great reliance on transferring and translating difficult words either into French or Arabic if not translating the whole paragraph. The use of the latter strategy emphasises the fact that students look for easy, efficient, and less

consuming ways specially that the majority (62.07%) have insufficient language knowledge (stated earlier in section one background information). All the results are grouped in the underneath bar-graph



Graph 3.8: Strategies used in difficult paragraph

Among the factors that facilitate learning and reading in English is the large number of cognates between French and English part. A high degree of science vocabulary is the same in French as in English since some technical terms are originally derived from Latin. Words such as: *parasite, zone, muscles, enzyme, hormone, pathogen, substance, molecule, biosphere...* are known to NLS students, they have already mastered them in French (language transfer⁴). But the problem is when they meet some words which are typically English, they use special glossaries and scientific dictionaries.

The other strategy which is also used is rereading and moderating the speed of reading (self-regulated strategies) with a percentage of (55.2%). They reread and slow down the rate of reading in order to ensure that they control their reading. Rereading and reading slowly are metacognitive strategies which the reader uses to devote some time to mental processes specially to recall language knowledge and content schema to form connections and activate background knowledge. This can be also done by

⁴ The issue of language transfer is always present in the context of foreign languages learning.

focusing on the clues which convey the main information. In the same context, (48.3%) of the whole population cooperate with colleagues in order to exchange information particularly if the two above strategies are not fruitful. They discuss ideas and try to look for difficulties together particular when dealing with texts needed for research or experiments.

Connectives and discourse markers are less used as reading strategy since the cumulative percent is only (13.8%). Students do not know the meanings of some discourse markers. Another factor is that they favour the simple and easy ways to understand what they want to and achieve their purpose that is why translation gets the most cumulative percent.

Question Four

Among the problems which NLS students face is difficult and unfamiliar words. The strategies used to compensate for the problem depend on each student purpose, need, and linguistic abilities. In the tables underneath, the results are tabulated, sketched out in bar-graph, and analysed.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	8	27.6	27.6	27.6
2 (no)	21	72.4	72.4	100.0
Total	29	100.0	100.0	

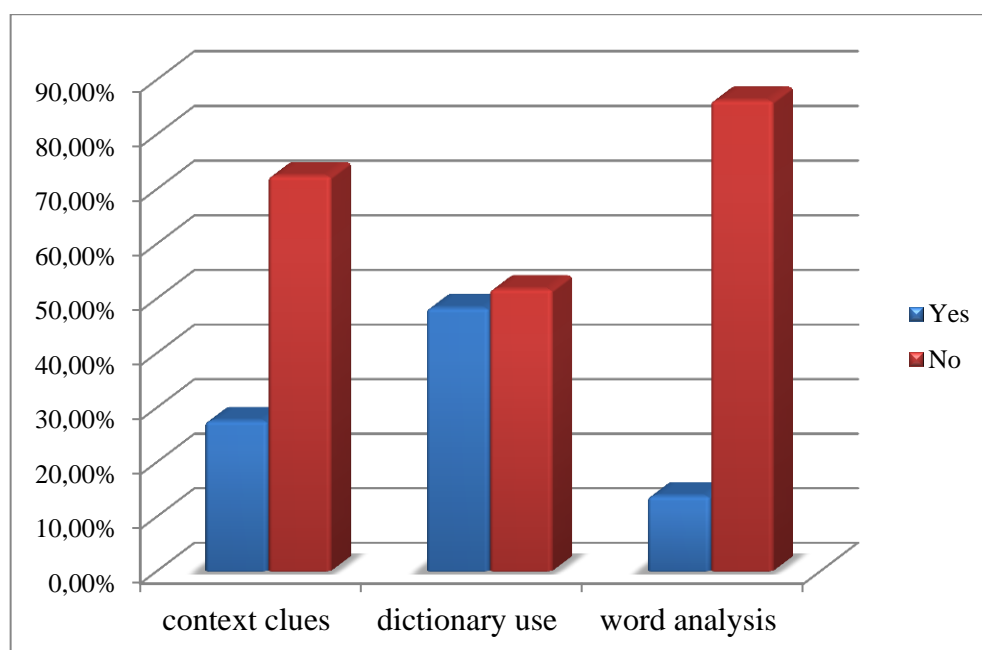
Table 3.23: Context clues

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	14	48.3	48.3	48.3
2 (no)	15	51.7	51.7	100.0
Total	29	100.0	100.0	

Table 3.24: Dictionary use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	4	13.8	13.8	13.8
2 (no)	25	86.2	86.2	100.0
Total	29	100.0	100.0	

Table 3.25: Word analysis



Graph 3.9: Strategies used with difficult words

The obtained data, clearly, show the percentages of strategies used to cope with unfamiliar words. 'Dictionary use' gets the high score (48.3%) in comparison with 'context clues' and 'word analysis' respectively. First, the ability to use context clues is a technique which not all the students can use. It requires students to have some textual knowledge. Only a limited proportion of NLS students (27.6%) exploit clues when they encounter unfamiliar words. They use the available contextual clues that surround the unknown word: definitions, examples, comparison and so on, it depends on the text structure and the linguistic load. Such strategy means also the ability to infer connections between sentences. The remaining students (72.4%) do not use this strategy. The result can reflect the lack of linguistic schemata which is congruent to their content area. It also means that they use other strategies to decode unfamiliar words.

Second, the context of the study is reading scientific texts. NLS students need to have exact information and vocabulary. The reported data indicate that (48.3%) of the participants use dictionary when they face unfamiliar words. Hence, they consult dictionaries and scientific glossaries to get the accurate meaning of some concepts and notions. When the text is too difficult, context clues cannot help to find the meaning of the unknown word. For this reason, they use and consult dictionaries particularly if the text is a path to get specific information.

Therefore, dictionary use is prevalent strategy, though not always good, in the context of foreign language learning. The other remaining students (51.7%) do not consult dictionaries because it is not always available to consult it. Moreover, it is not always aimed to know the meaning of each word in the text. It means that students skip difficult words, since context clues are rarely used, to get only the purposes. They do not consider the necessity to understand the meaning of each word. They need only to know what meets their purposes and needs. Thus, NLS students read for some particular purposes which have been discussed earlier.

Third, ‘Word analysis’ has the least score only (13.8%) in comparison with the two above strategies. It is one of the techniques used by students to decode unknown words by developing an awareness of word parts. The meaning of prefixes and suffixes is known as *morphemic analysis*. If the student is aware of the meaning of word parts, this may help her to get the word meaning or at least have some hints about its structure. Only four students use morphemic analysis to infer the meaning of unknown words. The use of such strategy denotes that students are aware of the meanings that word parts (prefixes and suffixes) convey. However, the majority of students (86.2%) do not use morphemic analysis. Thus, it is not always a matter of awareness. This is due to some points; not all the difficult words have the structure of prefix and suffix such as verbs, functional words (connectives and discourse markers) and so forth. On the whole, it is an expected result since the majority of NLS students prefer to directly consult dictionaries instead of spending time analysing the parts of the word or looking for context clues.

Question Five:

Reading for information, primarily, requires the use of some strategies to understand, learn, organise, and store information. The below data show the results of each strategy.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	18	62.1	62.1	62.1
2 (no)	11	37.9	37.9	100.0
Total	29	100.0	100.0	

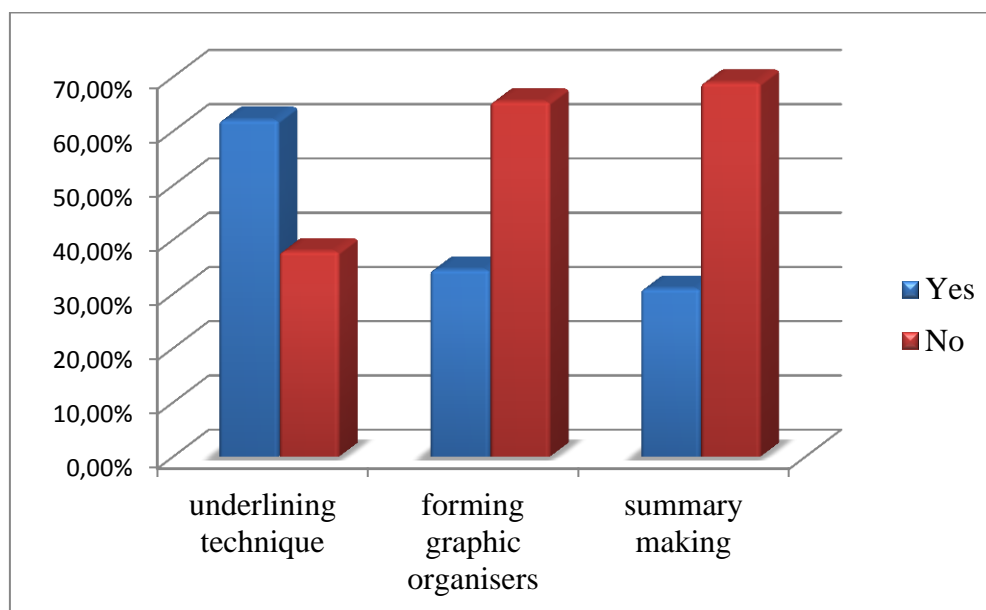
Table 3.26: Underlining technique

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	10	34.5	34.5	34.5
2 (no)	19	65.5	65.5	100.0
Total	29	100.0	100.0	

Table 3.27: Forming graphic organisers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 (yes)	9	31.0	31.0	31.0
2 (no)	20	69.0	69.0	100.0
Total	29	100.0	100.0	

Table 3.28: Summary making



Graph 3.10: Strategies used in understanding texts

According to the above data, underlining is the most used strategy with a high cumulative percent (62.1%) in comparison with note taking and forming graphic organisers. NLS students use this technique to highlight and mark the main information in a given text. It means that students locate only the needed information by underlining and highlighting. In the same context, (34.5%) of the whole participants form graphic organisers to learn and organise information found in the text since underlining can only be useful when locating specific information. However, the use of such strategy shows that the student has really attained and got the communicated written text.

Students visualise information and form graphic organisers to classify and organise information, especially that science texts deal with biological processes, natural phenomena, environmental issues, and so forth. Such aspects can be visualised and represented in graphic organisers to make them more understandable. However, the remaining students (65.5%) do not use the latter technique. This refers to a lack of linguistic schemata since the strategy requires knowledge of relationships among ideas, text structure, and discourse markers in addition to the ability to locate key words and main ideas that the text contains. Thus, not all students are able to do so.

Concerning summary making, only 9 students use this strategy. They use it in order to record and take information which they need for the sake of achieving some special purposes. It helps students store and recall the main points they have read. This strategy

is the less used (31%) if compared with the above mentioned strategies. The two strategies forming graphic organisers and summary making are important strategies. Students need to connect concepts and organise information in more logical and scientific manner. They also need to be instructed in how to take structured note taking which means the ability to take and note the essential ideas and facts.

3.4 Findings, Discussion, and Interpretation

The data analysis provided by the questionnaire raise many points. First, the results of the questionnaire indicate that the main reading difficulties which NLS students face are those related to sentence structure (the morpho-syntactic level) and general vocabulary. The time allotted for the ESP courses does not allow students to build and develop a sound linguistic competence. In many cases, students stick to a list of specialised vocabulary learnt by heart (translated into Arabic). This is why specialised vocabulary is not classified as the most difficult issue. In addition, the morpho-syntax problem refers to the inability of students to master the rules of grammar and syntax. Students are not trained in the way sentences are structured. The absence of an official syllabus also influences the learning situation of students. The design of ESP courses is based on the students' needs, lacks, and deficiencies. Such a point is not applied in most of the Algerian ESP context.

The most applied strategies to solve reading difficulties and meet the reading purposes are the following: skimming and previewing (72.41%), scanning for specific information (89.7%), predicting and activating background knowledge (75.9%), surveying the available non-linguistic data (visual aids) 100% and translation (65.5%). The results imply that content schemata strategies (predicting and activating background knowledge) and learning styles and language transfer abilities (skimming, scanning, and translation) are the mainly used. Systematically, the results confirm, to some extent, the second hypothesis.

In addition, to unlock the meaning of difficult paragraph, the most used strategy is translation. They see it as a simple and easy way although it is not a good technique particularly if students look for developing scientific and reading literacy. Rereading and modifying the speed of reading (metacognition abilities) are also used but less than the use of translation. Other problems are also encountered at the level of vocabulary.

The results indicate that students use dictionary to get the exact meaning more than their reliance on context clues.

The ultimate aim of reading is comprehension, some techniques are used to ensure and keep the information gained from the text. Students report that the most applied way is underlining the main points in order to be highlighted. Succinctly, some strategies are transferred between languages (first language⁵, second language and foreign language) such as note-taking and self-regulation strategies (underlining, rereading, moderating reading speed). In this context, the notion of language threshold is significant that is a combination of first language reading ability and second or foreign language proficiency. Each student develops some special learning strategies to interact and get the wanted goals.

Second, the five most used strategies are ranked in terms of high percentage respectively (surveying visual aids, scanning, predicting and activating content knowledge, skimming and previewing, and translation). Such order aims to prove or disprove the third hypothesis which assumes a kind of relationship between the reading purposes and the most applied strategies. Since the two variables are ranked in terms of importance and frequency use, it means that they are types of ordinal data and subsequently are types of non-parametric⁶ tests. In this case, the most suitable correlation coefficient is Spearman correlation. The data of reading purposes and the mainly used strategies are converted to ranks. Measurement of correlation is determined in the following mathematical formulae:

$$\text{Spearman coefficient of correlation} = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

d = difference between ranks of each pair of the two variables (x and y).

n = number of pairs of observations.

In this case, x = the most used strategies y = the ranked purposes of reading

5 The issue of first language is very problematic. Some theories indicate that first language is caught not taught. The problem is that Arabic language in Algeria cannot be considered the first language because there are many sub-languages (dialects). Thus, the situation is controversial. It can be assumed that Arabic (classical Arabic) is the first language although it is not.

6 Non-parametric tests: a rank correlation is non-parametric technique for measuring relationship between paired observations of two variables when data are in the ranked form (Kothari, 2004: 139).

The following table describes the paired variables of both most applied reading strategies and reading purposes

Ranks	1	2	3	4	5
The most used reading strategies	Surveying visual aids	Scanning	Predicting and activating background knowledge	Skimming and previewing	Translation
Ranks	3	4	2	1	5
Reading purposes	to get a general idea about the text	to understand the whole text	to answer for the exam	to look for specific information	to improve scientific literacy and knowledge

Table 3.29: Ranks of the two variables reading purposes and reading strategies

The SPSS 13.0 counts it directly and provides the following table

			Reading strategies	Reading purposes
Spearman's rho	The most used reading strategies	Correlation Coefficient	1.000	.10 0
		Sig. (2-tailed)	.	.87 3
		N	5	5
	Reading purposes	Correlation Coefficient	.100	1.00 0
		Sig. (2-tailed)	.873	.

Table 3.30: Spearman Correlation coefficient between the most used reading strategies and reading purposes.

It can be noted that the correlation coefficient of Spearman is 0.100 i.e. 0.1. It means that the numeric value is within the range -1 to +1. The value 0.1 means there is a kind of relationship between the most applied reading strategies and the ranking of reading purposes but this relationship is not very strong. This is may be due to the intervention of other variables such as: attitudes, reading difficulties, and others. Another element should be stated is that ‘correlation does not imply causation’. In other words, it is not meant that the independent variable purposes of reading causes the dependent variable reading strategies rather it means that the independent variable

influences the dependent variable that is the most used reading strategies. Thus, it can prove that there is a relationship between the purpose of reading and reading strategy frequently use. To this point the third hypothesis is confirmed. Indeed, there is a kind of relationship between the most used strategies and purposes of reading. One can deduce that the independent variable 'purposes of reading' influences the use of reading strategies. It is proved statistically by Spearman correlation. Thus, the use of reading strategies is to some extent based on purposes of reading texts.

It is apparent that both independent variables, purposes of reading and reading difficulties, influence reading strategies use but one cannot deny that the reading process is an overlap of many factors and sub-processes. However, it is not possible to study all the variables at the same time. It is therefore crucial to hint some issues which have some relationships to the current study. First, motivation and interest in learning English and reading it are also important factors which may make the student look for tools and strategies to achieve the desired purposes of learning through English texts because the general framework is learning a language for specific purposes.

Second, it can be noted that the teacher is not following any explicit instruction of reading strategies. The main tasks, he devised for the text, are questioning and highlighting the main ideas. Therefore, this may make students develop an attitude towards looking only for an answer to the proposed questions. Such a point can be seen from two angles: the first side is positive in which students develop effective and efficient ways to get answers for the questions and interact in the session. The second side is somehow negative in which students become reliable only on looking for answers to the questions and they do not pay attention to the information of the text, the kind of vocabulary, and the structure and form of the text. These aspects can help the student to increase scientific reading literacy.

In a nutshell, it is evident to note that NLS students use reading strategies to achieve their needs and purposes of reading and to compensate for reading difficulties. They bridge the gap between the purposes of learning and the lack of appropriate language proficiency. The analysis of reading strategies for NLS students aims at highlighting the ESP context.

3.5 Conclusion

In the third chapter, the data collected from the interview and the questionnaire have been analysed qualitatively and quantitatively. The first tool indicates the teachers' perception of teaching reading in ESP. The second procedure raises needs, attitudes, purposes, difficulties of reading specialised texts. It, precisely, highlights the reading strategies used to compensate for reading difficulties and achieve purposes of reading. The findings show that the highly applied strategies are those related to content schema, translations, and learning styles and techniques as skimming and scanning. The obtained results also confirmed the hypothesis that there is a relationship between the purposes of reading and the most applied strategies. A Spearman correlation coefficient proved it statistically. To some overall extent, the questionnaire' data analysis confirmed that students use reading strategies to bridge the gap between formal schemata deficiencies and the goals of reading.

General Conclusion

General Conclusion

Throughout this investigation, it is attempted to present the learning situation of English for Specific Purposes. Reading is seen as a skill which can serve as a bridge for specialised students to be up-to-date with the new information and knowledge in the field. In this respect, the notion of reading in content areas has found its place. The latter means that students read texts related to their subject discipline. In addition, recent theories of reading call for the interactivity between the reader and the text. The reader brings the content schema process that is the knowledge of the subject matter, the conventionalised aspects of discourse community, and all the experiences and understandings of the specialised discipline. However, the text provides the formal schema structure; the textual and linguistic clues, rhetorical structures, discourse markers, and the genre type of the text, etc. Hence, difficulties and obstacles in one of them or both can be compensated by applying reading strategies.

Therefore, the main goals of the current descriptive and analytical study are to highlight the following issues. First, it aims to describe the reading difficulties NLS face. Second, it seeks to measure and describe the most applied strategies in order to solve the reading difficulties and meet the purposes of reading. In other words, the research has the objective of analysing the variables which influence the use of reading strategies particularly that students can rely on some strategies to deal with reading difficulties and meet reading purposes. Analysing the reading strategies can diagnose the extent to which NLS students use them to compensate for the reading deficiencies. NLS students are highly familiar with content schema knowledge but as the case of many ESP students, they suffer from some formal schema deficiencies which may refer to students' low learning levels and teachers' instruction particularly that the time allotted to ESP courses is very limited. Thus, familiarity with subject discipline is an important factor to reading in content areas.

For ESP students, reading is seen as 'reading for learning'. The main aim is the transmission of information and knowledge conveyed in texts. So, the text is a vehicle for information and disciplinary contents. In this sense, students need to read, understand, and use content discipline knowledge for the purpose of getting knowledge and information.

Furthermore, the analysis of the research procedures, the structured interview of teachers and the questionnaire of students, provide a kind of both qualitative and quantitative data, respectively. The first tool (the interview) is designed to get insights about the teaching and learning situation. It aims at getting data about the way students are taught. The responses show some different perceived views and other mutual point. The answers of the interview depend on each teacher's speciality, experience, and awareness of teaching reading ESP courses. The results show the different ways of designing reading courses. In short, the aim of the interview is to explain some results of the students' questionnaire. On the other hand, the questionnaire addresses both reading strategies and the other independent variables named purposes of reading and reading strategies. The findings of the questionnaire indicate that the main reading difficulties are those related to long and complicated sentence and general vocabulary. In this connection, the most applied strategies to solve reading deficiencies and get the reading purposes are: content schema strategies (predicting and activating background knowledge, surveying non linguistic data, if available), learning styles and techniques (skimming and scanning), and translation.

The results confirm, to some extent, the reliance on content schema abilities in comparison with linguistic schema strategies. It means that NLS students have low proficiency. Moreover, the analysis of the questionnaire determines that there is a kind of relationship between the most applied strategies and the ranking of reading purposes. It is proved statistically by Spearman coefficient correlation. Therefore, reading purposes determine the use of reading strategies. Reading difficulties can also influence the use of reading strategies. The general results indicate that NLS students used reading strategies to meet their purposes and needs of reading and compensate for reading problems.

It becomes a necessity for the teacher to adopt an ad hoc methodology for teaching reading. So, incorporating some reading strategies instruction is seen as an important factor to make reading more effective and more efficient. NLS students need to be instructed in some reading strategies such as 'graphic organisers'. It is also known as 'information transfer'. This means that the student is required to transfer information from the written text to 'a graphic organiser' (diagram,

picture...) highlighting the most important points. For example, students can be asked to complete a diagram, or a table on the basis of the information conveyed in the text. Conversely, the teacher can ask students to write about a 'biological process' with the support of diagram representation or writing about the 'carbon cycle' with the support of 'graphic organiser'. Further, in order to facilitate reading comprehension, strategies should be incorporated into the reading courses as part of pre-reading and post-reading tasks. For example, asking questions about the text before reading to make students activate their background knowledge. In short, it is important for ESP students to develop strategies and techniques which aid in understanding and retaining key concepts from textbooks, essays, and technical materials to act and interact in their specialised discipline.

The present study may form a starting-point for future in-depth investigations into the use of findings in the field of ESP reading and reading strategies. Future research may tackle more particular specialised reading strategies that ESP reading requires. Another research may also tackle the role of teaching genre features to facilitate reading for ESP students who need to read texts in their subject discipline. Systematically, studies can also analyse the textual and non-textual features that scientific texts entail providing a corpus-based data. Such an analysis may provide some pedagogical implications for syllabus designers

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Appendices

Appendix (A)

Teachers' Interview

The interview:

It is a nice pleasure to have an interview with you. We hope to answer the questions.

The questions are as follows

Thanks for your collaboration

Questions:

- 1- Have you had any special training for instruction before being required to teach ESP courses?
 - 2- What is the content of the course that you teach?
 - 3- Is there any kind of cooperation between the specialized teacher and the general language teacher?
 - 4- What kinds of texts you prepare for the students?
 - 5- How do you find the nature of vocabulary found in scientific texts?
 - 6- Which difficulties you face during the reading sessions?
 - 7- Can students read and understand English specialized texts?
 - 8- Do you follow any direct explicit instruction of reading strategies?
-

Appendix (B)

Students' Questionnaire

The questionnaire

This is not a test but a questionnaire carried out by a researcher as a part of study conducted to investigate reading and more specifically reading strategies that you use in reading texts. The following questionnaire is regarded as a tool for gathering information data. So, help the researcher, please! And answer the questions freely and sincerely. If you do not want to answer particular item, you do not have to.

Thank you for your cooperation.

Section One: Background Information

Age:

Gender:

Male

female

Pre-university branch

Experimental sciences

Math

Special field

Plant ecology

animal ecology

Experience and proficiency

French insufficient level good level

English insufficient level good level

Section Two: Motivation, Purposes, and Difficulties

1 - Is it necessary to have an English session? yes no

2 - Do you find the reading session interesting to your content area? yes no

3 - Do you feel it very necessary to read English science texts? yes no

4 - Is your reading of English science texts always based on purpose?

Always

sometimes

never

5 - For which purposes you read English science texts? Arrange the following purposes in order of importance, from the most to the least one. The most important takes N°1, the second takes N°2, till the least important N°5.

a- To get a general idea about the text

b- To understand the whole text

- c- To answer for the exam
- d- To look for a specific information that you need.
- e- To improve scientific literacy and acquire more information

6 - What makes a text difficult to understand?

- | | | |
|--|-----|----|
| a- Specialised vocabulary | yes | no |
| b- Complicated and long sentences | yes | no |
| c- General vocabulary | yes | no |
| d- Unfamiliarity with the text content and context | yes | no |

Section Three: Reading Strategies

1 – When reading science texts how do you get the main idea of the text? (Cross the suitable answer)

- a- You use skimming and previewing to get the general idea
- b- You read word by word (in depth reading) until you understand the text's idea.

2 - When reading a science text:

- | | | |
|---|-----|----|
| a- Do you predict and activate background knowledge? | yes | no |
| b- If visual aids (picture, charts) are available, do you use them? | yes | no |
| c- Do use scanning to find and locate specific information? | yes | no |
| d- Do you take notes about the important ideas? | yes | no |

3 – How can you work out the meaning of a difficult paragraph?

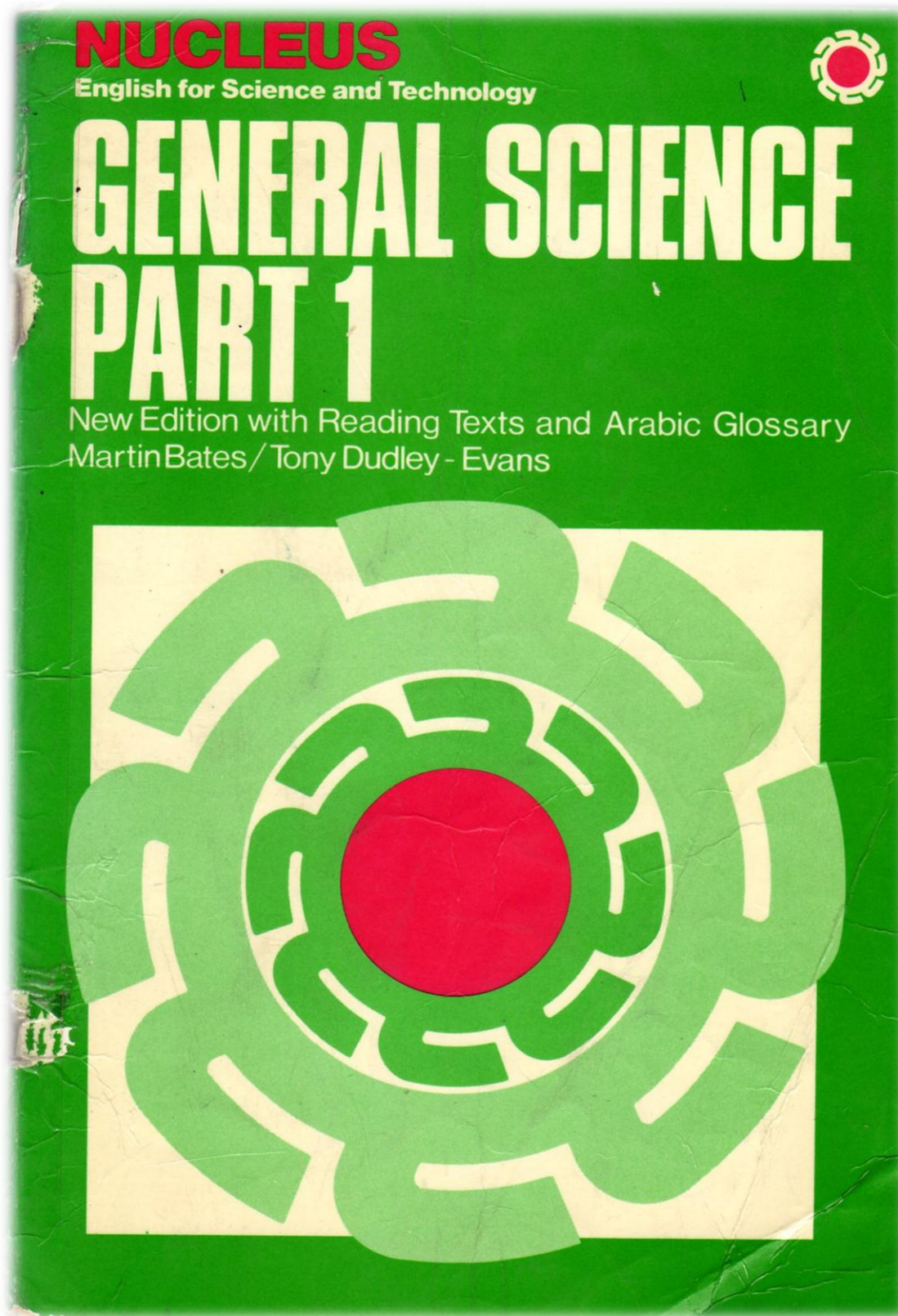
- | | | |
|---|-----|----|
| a- Do you slow down and reread the paragraph? | yes | no |
| b- Do you use connectives and discourse markers to help you join ideas? | yes | no |
| c- Do you cooperate with colleagues? | yes | no |
| d- Do you translate the difficult words? | yes | no |

4 - What do you do when you find a difficult or unfamiliar word in a text?

- | | | |
|---------------------------------------|-----|----|
| a- Do you look for the context clues? | yes | no |
| b- Do you use the dictionary? | yes | no |
| c- Do you divide the word into parts? | yes | no |

Appendix (C) Texts Samples

The title page of the reading textbook: GENERAL SCIENCE PART 1



NUCLEUS is an integrated series for students who need English language skills for specialist purposes. It provides a sound basis for the study of scientific and technological subjects in English. Moreover, it ensures complete motivation through interesting situations and enjoyable language activities.

The concept-building 'core' of the series is the *General Science* course which presents aspects of language use common to all disciplines. Related to this core there are ten specific courses for different subjects. Each book exploits these aspects within the context of the individual subject, and develops reading and listening comprehension.

The new two-volume edition of *General Science* features reading texts with accompanying exercises as well as an English-Arabic glossary. *General Science* may be used independently, or as an introductory course to the specific books, or in parallel to them. The specific courses can also be used independently in intensive situations. Each book follows the same twelve-unit structure. The titles in the series are:

Engineering Biology Geology Agriculture
Mathematics Medicine Nursing Science
Architecture and Building Construction
Physics Chemistry

All students' books are accompanied by separate teacher's notes on methodology and scientific background. A new and expanded *Teacher's Manual* has been prepared for use with the new edition of *General Science*.

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 Longman

ISBN 0 582 74861 5

NUCLEUS 

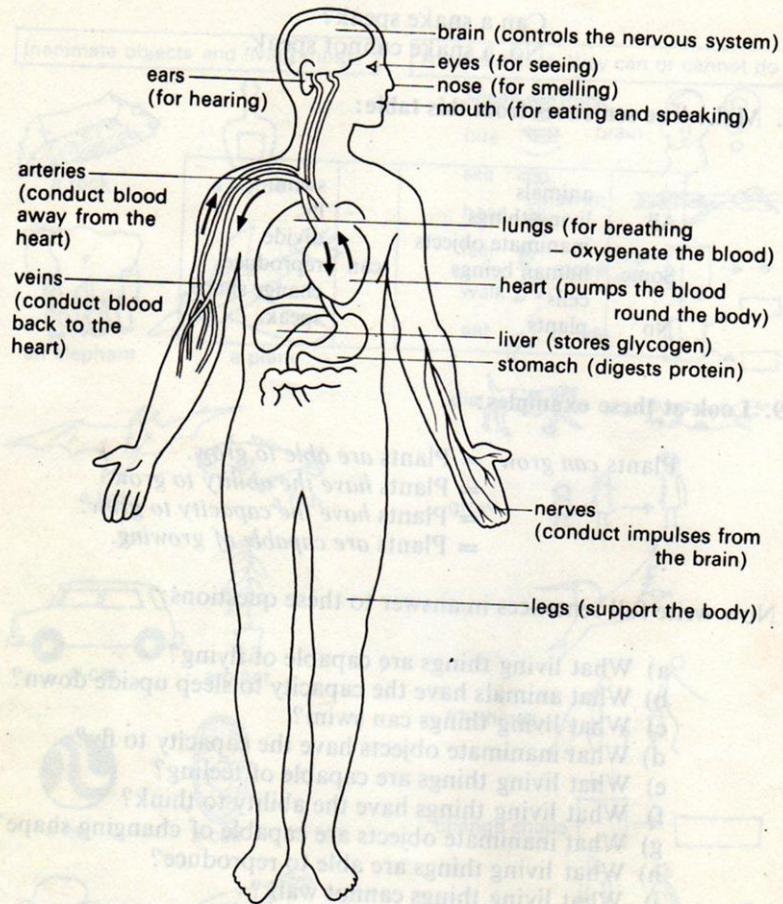
English for Science and Technology

Series Editors: Martin Bates and Tony Dudley-Evans

A picture of the human body serves as a visual data for the text

Section 4 Functions in the human body

10. Look and read:



Internal and external parts of the human body and their functions

Now complete these sentences:

- Our eyes _____ us _____ see.
- With the help of our mouths we are _____ to speak and eat.
- Our ears are organs for _____.
- With the help of our noses we _____ smell things.
- Our lungs enable us to _____.
- The lungs serve to
- The _____ of the heart is to circulate the _____.
- The heart acts as a _____ for the blood.
- The stomach is used for

The functions of the systems in the human body: a classification and generic text-type

- j) The liver is a place for _____.
- k) The _____ act as a support for the body.
- l) The function of the nerves is to
- m) The function of the brain
- n) The veins
- o) The arteries serve

Section 5 Reading

11. Read the text. Then say which of these titles is most suitable and why:

structure
location
The functions of systems in the human body
properties

The human body is made up of a number of different systems. Each system has a separate function, but some work together. One system is the skeleton, which serves to support the body and protect the internal organs. The respiratory system enables us to breathe and take oxygen into the blood, which moves around the body by means of the circulatory system. The digestive system enables us to take in food needed for growth. Waste matter is ejected from the body by means of the urinary system.

The endocrine system consists of various glands, such as the thyroid, sex and adrenal glands. The function of these glands is to secrete chemicals, known as hormones, into the blood. These hormones control various processes in the body, such as growth, sexual activities and digestion. The nervous system controls the other systems and enables human beings to think.

Each system is made up of organs. The lungs, for example, are part of the respiratory system. The heart is an organ in the circulatory system. The liver functions as part of the digestive system and other systems.

Every organ is composed of several kinds of tissue. Epithelial tissue, which includes the skin, forms a covering over organs. Connective tissue supports and holds together parts of the body and includes bone and cartilage. Other types of tissue include nerve tissue and blood tissue.

All tissue consists of cells. These are so small that they are measured in thousandths of a millimetre and can only be seen with a microscope. Each cell is covered with a thin membrane which surrounds a nucleus, and a jelly-like substance, called cytoplasm. This in turn contains minute particles, each with its own special function.

The carbon cycle: a sequence and process text type

11. Put these stages in the right order and then match them with the expressions on the left:

Example: First, the site is bought.

Stages in building a house

- First,
- Then,
- Meanwhile,
- Subsequently,
- At this stage,
- Next,
- Afterwards,
- Then,
- Later,
- Eventually,
- Finally,

- the drains are dug.
- the materials are bought.
- the house is painted.
- the walls are built.
- the site is bought.
- the site is levelled.
- the foundations are laid.
- the house is ready to live in.
- the roof is made.
- the doors and windows are put in.
- the electricity and water systems are installed.

Section 5 Reading

12. Look at these questions and then read the text. Which paragraph answers each question?

- a) How do animals take in carbon?
- b) How is limestone formed?
- c) What is the carbon cycle?
- d) How do plants take in carbon?
- e) How is coal formed?
- f) How do animals give up carbon?

The carbon cycle

All plants and animals need carbon for growth. Carbon is present in the atmosphere in the form of carbon dioxide gas. But it is present only in small amounts. This means it has to be used again and again. Animals and plants continually take in and give out carbon during respiration. They also take it in when they feed, and give it out when they die. This continual process is called the carbon cycle.

Plants take in carbon from the air during photosynthesis. In this process, plants use energy from the sun together with carbon dioxide from the air. They then make sugars, and other carbohydrates. The carbohydrates are needed for the growth of roots, stems and leaves.

The leaves may subsequently be eaten by animals, which digest the carbohydrates. The carbon is then used for building muscles and bones. Some of the carbon, however, is returned to the atmosphere after respiration, when carbon dioxide is released from the body.

When an animal eventually dies, decomposition of the body tissue takes place. Through the action of bacteria and other organisms, the

Exercise type in the form of making graphic organizer

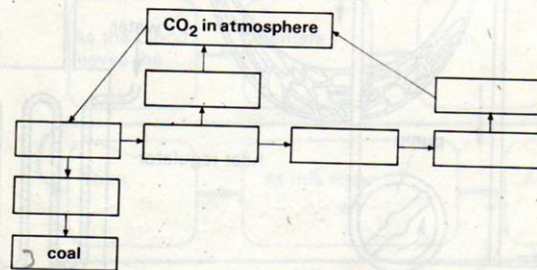
chemicals are broken down, or decomposed, and carbon dioxide is released.

Some dead plants are buried under earth. Over millions of years, the pressure of the earth turns them into coal. When coal is burned to produce heat, carbon dioxide is released.

Many tiny animals living in the sea have carbon in their shells, in the form of calcium carbonate. When these animals die, their shells form layers of calcium carbonate at the bottom of the sea. These eventually turn into a rock, called limestone. After movements of the earth, the limestone may reach the surface. The wind and rain then wear away the limestone, and some of its carbon is once more released into the atmosphere.

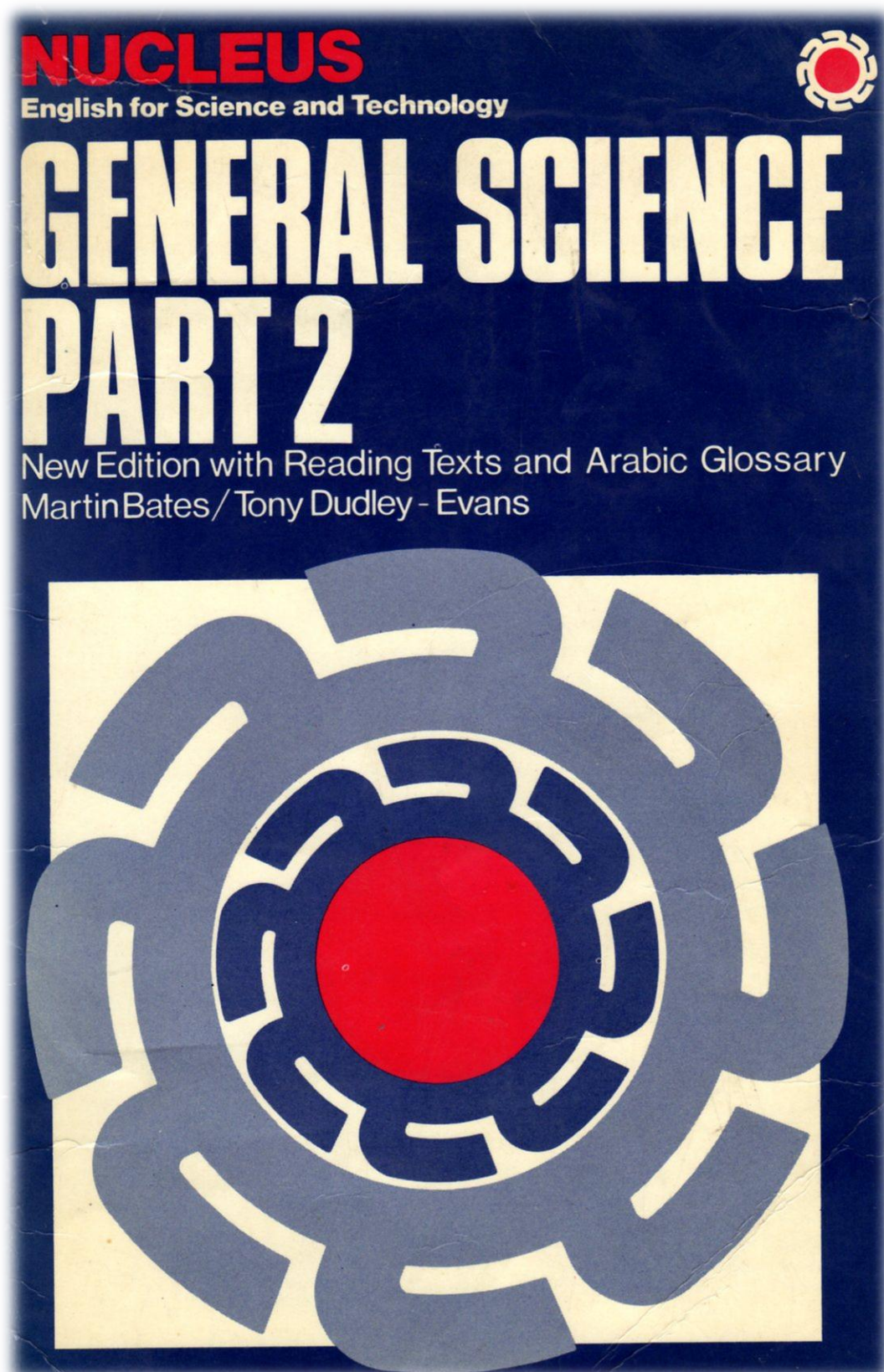
13. Put these labels into the flow-chart:

- CO₂ in atmosphere
- photosynthesis in plants
- animals eat plants
- coal
- animals die
- tissue decomposes
- animals breathe out CO₂
- CO₂ given off
- plants buried



Now make your own flow-chart of the formation of limestone.

The title page of the reading textbook: GENERAL SCIENCE PART 2



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 Longman

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English for Science and Technology

Series Editors: Martin Bates and Tony Dudley-Evans

Vitamins: a text type of classification

13. Look at the map again and answer these questions:

- a) Where is there a lack of oxygen?
- b) Where is there an excess of salt?
- c) Where is the land *over*-populated?
(ie the population is excessive)
- d) Where is the land *under*-populated?
(ie there is a lack of population)
- e) Where is there a lack of vegetation?
- f) Where is the cold excessive?
- g) Where is the rainfall inadequate?

Section 4 Reading

14. Read the text and find the answer to the following questions:

Which vitamins do the following foods contain?
 a) Milk b) Liver c) Eggs d) Cheese e) Fruit
 f) Vegetables g) Fish h) Oil

Vitamins

Food contains only minute quantities of the substances called vitamins, but they are vital for good health. For example, if you eat a diet of meat, bread, sugar and fat, you may become ill with a disease called scurvy. This is caused by a deficiency in vitamin C, which is found in fruit and vegetables.

About fifty different vitamins have been identified, and a deficiency in many of these can lead to illness. Vitamin A is most important for good eyesight, but is also important for general good health. Liver contains a considerable amount of vitamin A, but vitamin A is also found in fish, meat, milk, butter, some fruits and vegetables.

Vitamin B in fact consists of twelve different chemicals, which are found in eggs, cheese, butter, wholemeal flour and vegetables. If a person has an inadequate amount of vitamin B in his diet, this may affect his whole body, particularly the skin, the nervous system and the heart. Deficiency in vitamin B results in a disease called beri-beri.

Vitamin C prevents scurvy and helps to heal injuries. Some doctors believe that large quantities of vitamin C help people to avoid colds. Fruits and uncooked vegetables are rich in vitamin C, but when they are overcooked, or left for a long time, they lose most of their vitamins.

Vitamin D is essential for the growth of bones and teeth and is found in fish, liver, oil and milk. Vitamin D is the only vitamin which the body can make for itself, but it can only do this if there is sufficient sunlight. A lack of both sunlight and vitamin D can result in a disease called rickets, which causes bones to soften and to be deformed.

Vitamins are only needed in very small quantities. A quantity sufficient for a whole life would weigh only a quarter of a kilogram. Vitamins can be manufactured and are sold as additions to our food but a well-balanced diet will provide an adequate amount of vitamins.

The table indicate the classification of each vitamin

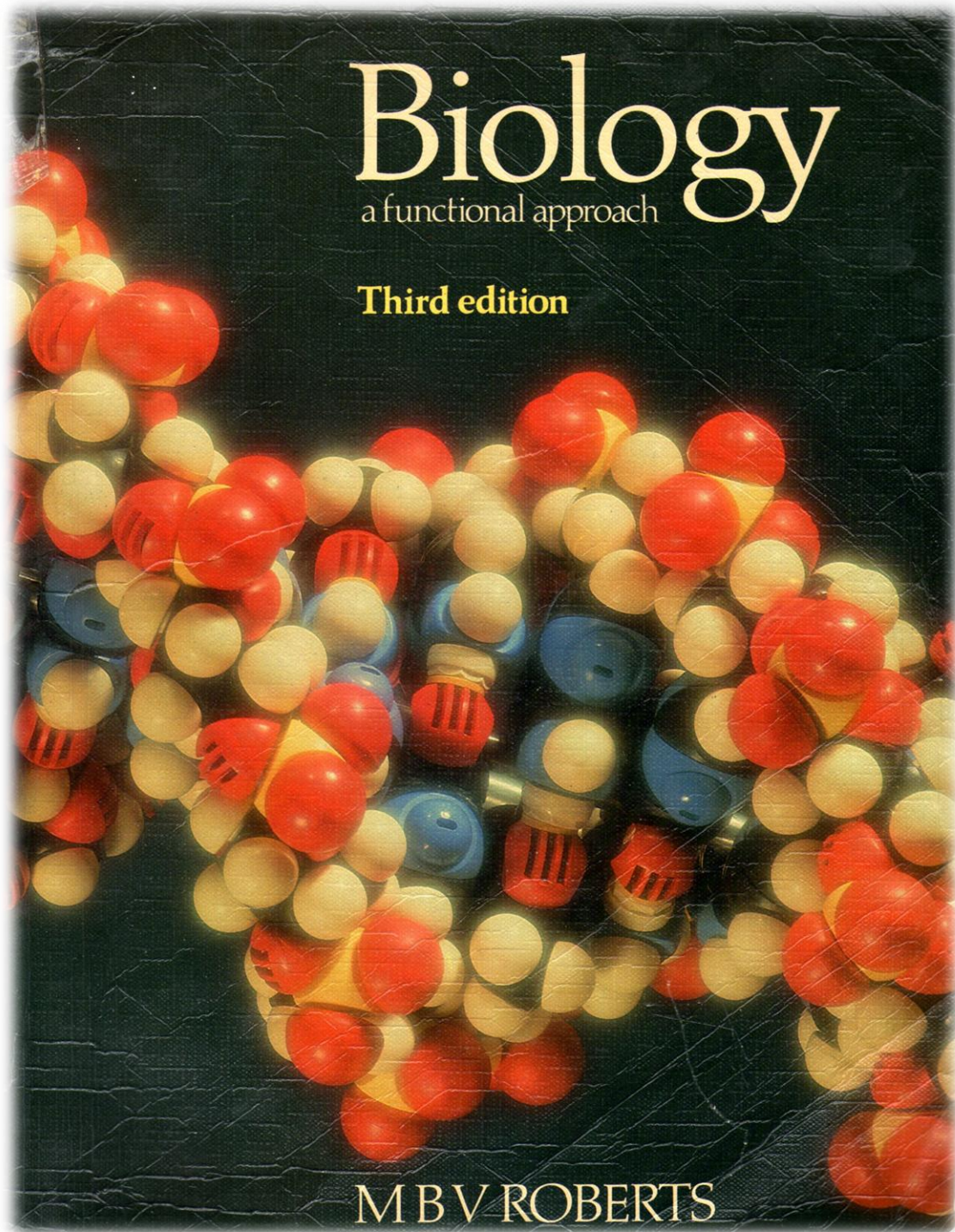
15. Complete the following table:

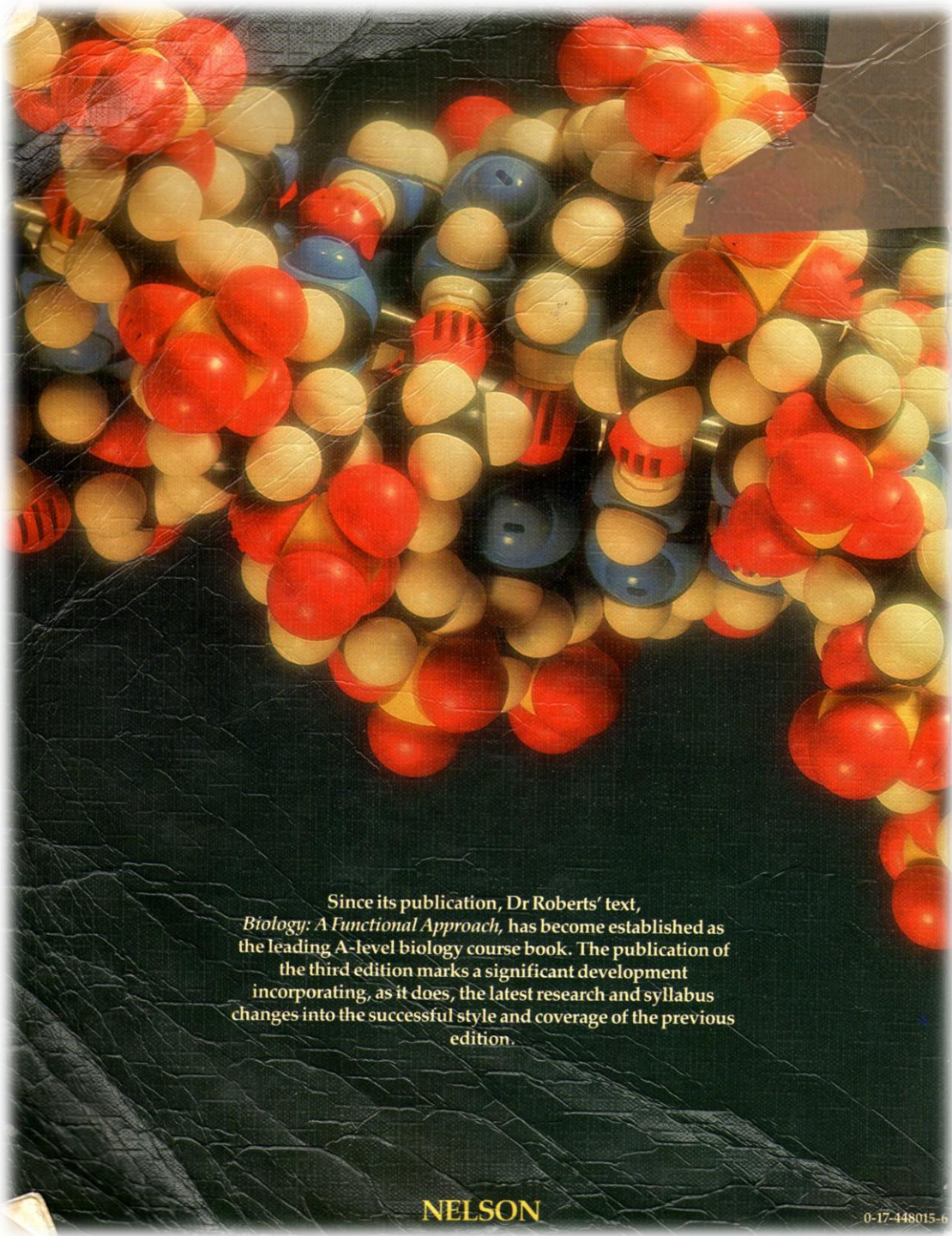
Name of vitamin	Foods the vitamin is found in	Results of a deficiency of the vitamin
	Milk, Eggs	

16. If a person is suffering from the following diseases, which foods will help him?

- Scurvy
- Rickets
- Beri-beri
- Poor eyesight
- Pellagra (a disease which affects the skin and the nervous system)

Some texts are chosen from this book “Biology: a functional approach”





Since its publication, Dr Roberts' text, *Biology: A Functional Approach*, has become established as the leading A-level biology course book. The publication of the third edition marks a significant development incorporating, as it does, the latest research and syllabus changes into the successful style and coverage of the previous edition.

NELSON

0-17-448015-6

Texts accompanied with diagram (visual data)

a micrometre, whereas a hormone may have to travel the full length of the body to achieve its full effect.

This may seem a rather academic point of comparison, but in fact it provides a basis for linking the two systems. This is best illustrated by the **adrenal glands**. The middle part of these glands, the **adrenal medulla**, secretes the hormone **adrenaline** which is chemically almost identical to the transmitter substance **noradrenaline** produced at the ends of the sympathetic nerves. It is interesting that adrenaline evokes the same responses as impulses in the sympathetic nerves: acceleration of the heart, constriction of arterioles, dilatation of the pupils, etc. In addition adrenaline induces a marked increase in the metabolic rate, so that the combined effect of the endocrine and nervous systems is to prepare the body for emergency.

We see, then, that there is a close connection between the endocrine and nervous systems. In the case of the adrenal medulla and sympathetic nerves, the connection is so close that one suspects that the two share a common evolutionary origin. Innervated by the sympathetic nervous system, the adrenal medulla can be looked upon as an enormous conglomeration of modified nerve cells which, being far removed from any effectors, shed their transmitter substance into the bloodstream.

PRINCIPLES OF HORMONE ACTION ILLUSTRATED BY THE THYROID GLAND

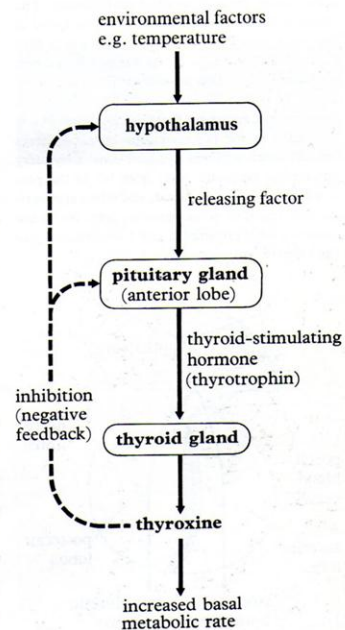
The **thyroid gland** can be taken to illustrate the basic principles of hormonal communication and action. Situated in the neck, the thyroid gland secretes **thyroxine**, a complex organic compound containing iodine. The iodine required for its synthesis is obtained from the diet. The structure of the thyroid gland (Fig 18.25) demonstrates the basic requirement of any endocrine organ, namely a close association between the secretory cells and the bloodstream. The secretory cells are arranged round a series of hollow **follicles**. Iodine is taken up into the cells from the bloodstream by active transport. **The follicles contain an inactive precursor of the hormone, thyroglobulin, which is thyroxine conjugated with a protein.** A proteolytic enzyme secreted by the follicle epithelium separates thyroxine from the protein. The free hormone then passes through the wall of the follicle into the bloodstream.

CONTROL OF THYROXINE PRODUCTION

How is the secretion of thyroxine kept to the requirements of the body? This is achieved by a **negative feedback process** of the kind discussed in Chapter 13. The shedding of thyroxine into the bloodstream is triggered by a hormone secreted by the anterior lobe of the **pituitary gland** (Fig 18.26). This is called **thyroid-stimulating** or **thyrotrophic hormone**. Now the production of thyrotrophic hormone is regulated by thyroxine itself: a slight excess of thyroxine inhibits the anterior lobe of the pituitary which responds by secreting less thyrotrophic hormone. This in turn reduces the activity of the thyroid gland, leading to a drop in the amount of thyroxine produced. This then removes the inhibitory influence on the pituitary so that more thyrotrophic hormone will be produced again, and so on. This is a good example of homeostasis and negative feedback (see Chapter 13).

Thyroxine is responsible for controlling the **basal metabolic rate**, and is therefore particularly important in growth. Under-secretion of it during

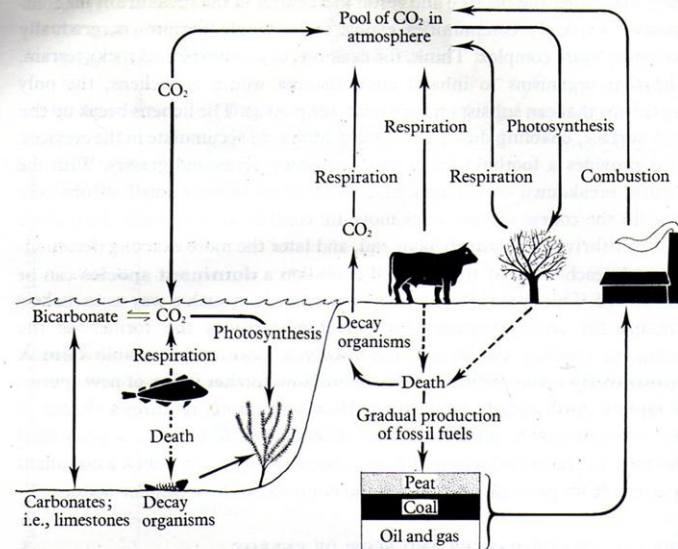
Fig 18.26 The principles of endocrine action illustrated by the thyroid gland. The secretion of thyroxine is regulated by the pituitary gland which in turn is subject to environmental influences acting via the brain. Notice how thyroxine, if in excess, can inhibit its own production by negative feedback. The thyroxine inhibits the thyrotrophin-producing cells in the pituitary gland itself, and it also inhibits the cells in the hypothalamus which secrete the releasing factor. Releasing factors are explained in Fig 18.27.



A text accompanied with visual data to shape the process of **the carbon cycle**

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Fig 32.12 The carbon cycle. The amount of carbon dioxide in the atmosphere is maintained by a balance between the processes which withdraw carbon dioxide from it (photosynthesis etc.) and those which add carbon dioxide to it (respiration and combustion). Solid arrows represent the flow of carbon dioxide. (Based on P. R. and A. H. Eberick, *Population, Resources, Environment*, Freeman 1972)



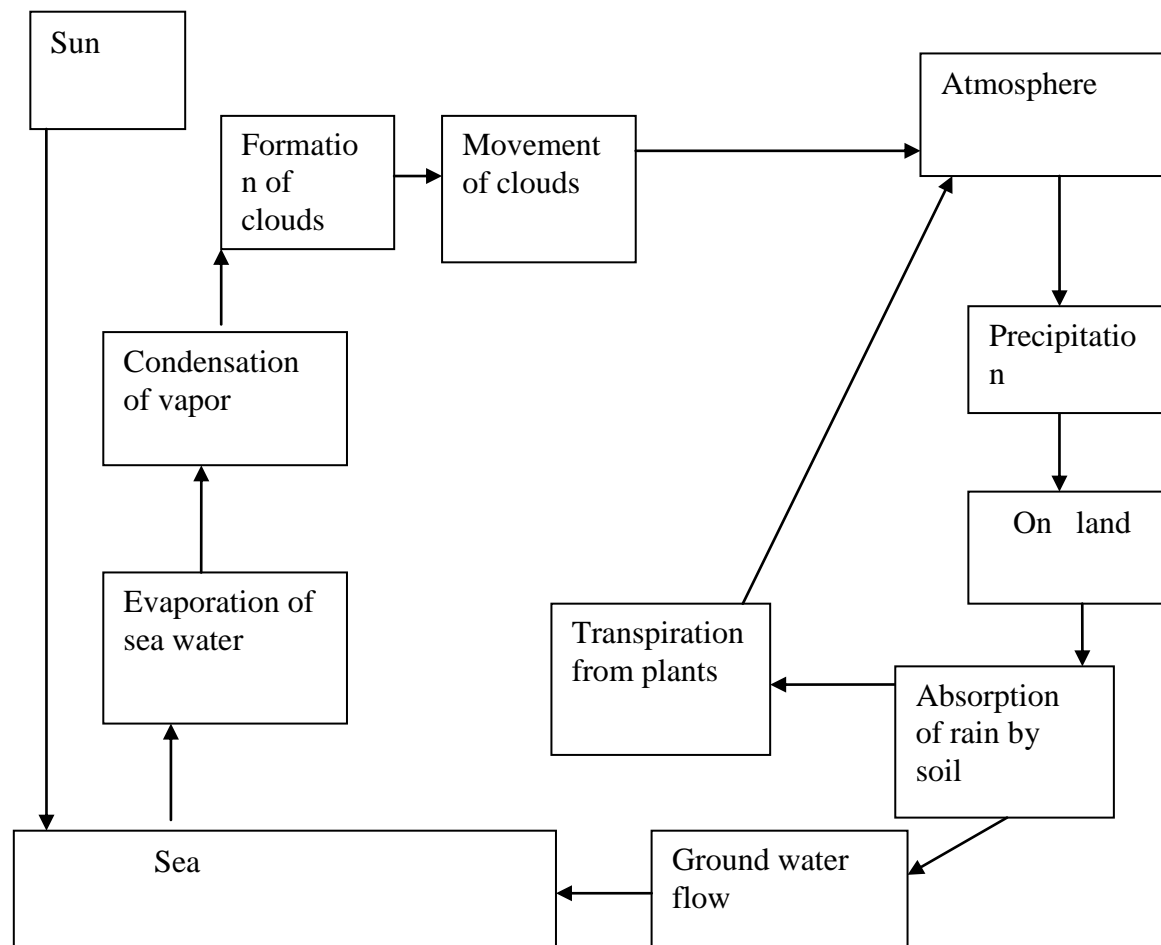
relates to the ecosystem as a whole. The atmosphere contains a 'pool' of carbon dioxide. Carbon dioxide is removed from the pool by the photosynthetic activities of plants, and is returned to it by respiration which is carried out by all organisms including those micro-organisms (decomposing bacteria) responsible for the decay of dead animals and plants.

Not all dead material decays. In situations where decomposing bacteria are unable to operate, such as in highly acidic or anaerobic conditions, dead plants form fossil fuels such as peat, coal, petroleum, and their gaseous derivatives. In natural circumstances the carbon contained in these permanent deposits would be lost from the cycle, but man, as we know only too well, uses these materials as a source of energy, and when they are burned carbon dioxide is returned to the atmosphere. It is important for us to realize that since the production of fossil fuels is a very slow process there is a limit to the rate at which man can draw upon them. The so-called **energy crisis** results from this obvious ecological fact.

Closely connected with the carbon cycle is the **oxygen cycle**. Oxygen used up in respiration and combustion is returned to the environment by photosynthesis. The atmosphere therefore contains a 'pool' of oxygen, just as it contains a 'pool' of carbon dioxide. As in the carbon cycle, a delicate balance between the oxygen that is withdrawn from, and that which is added to, the 'pool' maintains the oxygen in the atmosphere at a steady level – approximately 20 per cent.

The **nitrogen cycle** is more complex than the carbon and oxygen cycles and depends on the activities of various bacteria whose metabolic processes are explained in chapter 10. How the nitrogen cycle relates to the ecosystem as a whole is illustrated in Fig 32.13. Nitrate in the soil is built up by plants into protein which is then passed on to animals which eat the plants. The nitrogen from the protein is returned to the environment as ammonia, either

NSL students make a graphic organizer to the text of 'water cycle'



The water cycle

The **water cycle**, also known as the **hydrologic cycle** or **H₂O cycle**, describes the continuous movement of water on, above and below the surface of the earth. Water can change states among liquid, vapour and solid at various places in the water cycle. Although the balance of water on Earth remains fairly constant over time, individual water molecules can come and go, in and out of the atmosphere. The water moves from one reservoir to another, such as from river to ocean, or from the ocean to the atmosphere, by the physical processes of evaporation, condensation, precipitation, infiltration, runoff, and subsurface flow. In so doing, the water goes through different phases: liquid, solid, and gas.

The hydrologic cycle involves the exchange of heat energy, which leads to temperature changes. For instance, in the process of evaporation, water takes up energy from the surroundings and cools the environment. Conversely, in the process of condensation, water releases energy to its surroundings, warming the environment. The water cycle figures significantly in the maintenance of life and ecosystems on Earth. Even as water in each reservoir plays an important role, the water cycle brings added significance to the presence of water on our planet. By transferring water from one

reservoir to another, the water cycle purifies water, replenishes the land with freshwater, and transports minerals to different parts of the globe. It is also involved in reshaping the geological features of the Earth, through such processes as erosion and sedimentation. In addition, as the water cycle also involves heat exchange, it exerts an influence on climate as well.

Appendix (D)

Glossary of Terms

Glossary of Terms

Comprehension strategies: are the plans and or steps that students use to make a sense to the text. Some strategies are productive as skimming the text to get a general idea before careful reading, while others may be less successful as translation and highly dictionary use.

Discourse type: is a term which is given to descriptions of text through reference to the general rhetorical goals: description, exposition, classification ... Discourse type is a class of genres. (Davies, 1995: 92)

Genre: Swales (1990) provides a definition which is influential in the context of EAP/ESP; genre “is a particular type of communicative event which has a particular communicative purpose recognized by its users, or discourse community” (Flowerdew & Peacock, 2001: 15)

Graphic organisers: a visual aid that defines relationships among concepts and that lends itself to the teaching of technical vocabulary

Literacy: It is viewed as an expanding set of knowledge, skills and strategies which individuals build on throughout life in various situations and through interaction with their peers and with the larger communities in which they participate.

Metacognition: is the awareness and knowledge of one’s mental processes used to monitor, regulate, and direct them to a desired end; self-mediation; thoughts about thinking (cognition); for example, thinking about how to understand a reading selection

Schema: schema is “ *the reader’ background knowledge on which the interpretation of the text depends*” (Hudson, 2007: 302). Or schemata (plural form of schema) “*are the organized packages of knowledge [that the] brain uses to arrange and group similar experiences and concepts*” (Johnson, 2008: 4).

Reading strategy: specific learned procedure that foster active, self regulated and intentional reading.

Strategy: The term strategy is a key word, in which it needs more inquiry and clarification. In this context, Rubin (1987) considered strategy as: “...any set of

operations, steps, plans, routines, used by the learner to facilitate the obtaining, storage, retrieval, and use of information.”(Alderson, 2000: 308)

Text Structures: are the various patterns of ideas that are embedded in the organization of text. Common patterns of text structure are expository, cause-effect, comparison-contrast, problem solution, description, and sequence. The term structure refers to how the ideas in the text are structured to convey a message to the reader.(Hudson, 2007)
