

*Democratic and Popular Republic of Algeria*  
*Ministry of Higher Education and Scientific Research*

**UNIVERSITY OF ABOUBAKR BELKAID**  
**TLEMSEN**

*Faculty of Arts, Social Sciences and Humanities*  
*Department of Foreign Languages*  
*English Section*

**THE DESIGN OF ESP TEACHING MATERIAL FOR  
FIRST-YEAR POST-GRADUATE STUDENTS OF PHYSICS :  
UNIVERSITY OF ABOUBAKR BELKAID  
TLEMSEN**

This Thesis is submitted to the department of foreign languages in candidacy  
for the degree of Magister in Applied Linguistics and TEFL

*Presented by:*  
**Hidayet HEMCHE**

*Supervised by:*  
**Dr. Smail BENMOUSSAT**

*Jury Members :*

<b>Pr B. BENMOUSSAT</b>	Prof President ( University of Tlemcen )
<b>Dr S. BENMOUSSAT</b>	M.C Supervisor ( University of Tlemcen )
<b>Dr F. BEDJAOU</b>	M.C Examiner ( University of Sidi Bel Abbes )
<b>Dr I. SERIR</b>	M.C (Doctorat) Examiner ( University of Tlemcen )
<b>Dr H. HAMZAOU</b>	M.C (Doctorat) Examiner ( University of Tlemcen )

**Academic Year : 2006 - 2007**



DEMOCRATIC AND POPULAR REPUBLIC OF ALGERIA  
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH



**UNIVERSITY OF ABOUBAKR BELKAID**  
**TLEMSEN**

FACULTY OF ARTS, SOCIAL SCIENCES AND HUMANITIES  
DEPARTMENT OF FOREIGN LANGUAGES  
ENGLISH SECTION



**THE DESIGN OF ESP TEACHING MATERIAL FOR  
FIRST-YEAR POST-GRADUATE STUDENTS OF PHYSICS :  
UNIVERSITY OF ABOUBAKR BELKAID  
TLEMSEN**

This Thesis is submitted to the Department of Foreign Languages in candidacy  
For the Degree of Magister in Applied Linguistics and TEFL

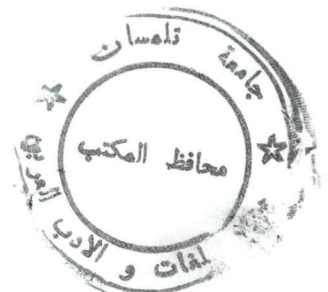
Presented by :  
Hidayet HEMCHE

Supervised by :  
Dr. Smail BENMOUSSAT

Jury Members :

Pr. Boumediène BENMOUSSAT	Prof. President	(University of Tlemcen)
Dr. Smail BENMOUSSAT	M.C Supervisor	(University of Tlemcen)
Dr. Fouzia BEDJAOU	M.C Examiner	(University of Sidi Bel Abbes)
Dr. Ilhem SERIR	M.C (Doctorat) Examiner	(University of Tlemcen)
Dr. Haféda HAMZAOU	M.C (Doctorat) Examiner	(University of Tlemcen)

**Academic Year : 2006-2007**





## DEDICATION

*I dedicate this work that I realized with God's help to the closest persons to me who switch on candles of light around me, to :*

- *My dear parents;*
- *My future husband;*
- *My two sisters, their husbands, as well as children;*
- *My grand mothers;*
- *My friends.*



## ACKNOWLEDGEMENTS

*I am deeply grateful to all those who helped me in the realisation of this work.*

*I would like to express all my gratitude and indebtedness to my supervisor Doctor Smail Benmoussat for his inestimable guidance, insightful suggestions, and invaluable advice.*

*I am also indebted to all the teachers of the English Department for their moral help and permanent support. My heartfelt appreciation goes to Mr. Benziane and Mrs. Benyelles.*

*Finally, but not least, I am particularly grateful to my parents and my future husband for their invaluable patience, understanding, and encouragement.*



## ABSTRACT

The present research tries to give a clear idea about the teaching of English for Specific Purposes; most commonly known as ESP; in Algeria through the investigation of a particular English teaching situation, namely that of the first-year post-graduate students of Physics, at the University of Aboubakr Belkaid, Tlemcen.

After six years of English learning experience; i.e. five years before entering the university and one year at the tertiary level; and despite the prominent importance of the English module to carry out post-graduate studies, the English teaching/learning situation in the Department of Physics remains still unsuccessful. Therefore, the aim of the present study is to account for the main reasons behind such unsatisfactory results and to sort out, alongside with this, the major issues facing ESP instructions.

In the light of the results obtained, some concrete measures and possible solutions will, therefore, be suggested. The present work is divided into four broad chapters presented as follows :

The first chapter is devoted to an overview of English for Specific Purposes, as opposed to general English, and to a survey of the different ESP teaching theories as well as the main parameters involved in the process of materials design.

The second chapter gives an overall description of the teaching of English in the Department of Physics, at the University of Aboubakr Belkaid, Tlemcen, with close reference to the level under study. This is followed by a detailed account of the different methods used in data collection.

In the third chapter, the investigator undertakes an analysis of the data collected with the aim to identify learners' needs and the main obstacles that hinder the success of the present ESP teaching/learning situation.

Finally, the fourth chapter is an attempt to bring some solutions to the problems identified and to recommend some designed materials and teaching methods with the hope to create the most favorable conditions for effective ESP instructions.



# CONTENTS

DEDICATION	
ACKNOWLEDGEMENTS	
ABSTRACT	
CONTENTS	
LIST OF DIAGRAMS	
LIST OF FIGURES	
LIST OF TABLES	
KEY TO ABBREVIATIONS	
GENERAL INTRODUCTION .....	1
<i>CHAPTER ONE : LITERATURE REVIEW</i> .....	3
1.1. Introduction .....	3
1.2. The Need for Literacy in English .....	3
1.3. Definitions of ESP .....	4
1.4. ESP vs. General English .....	6
1.5. The development of ESP Teaching Theories .....	7
1.6. Types of ESP .....	8
1.6.1. English for Academic Purposes : (EAP) .....	9
1.6.2. English for Occupational Purposes : (EOP) .....	9
1.6.3. EAP vs. EOP : .....	9
1.6.4. English for Science and Technology : (EST) .....	11
1.7. English and Science: .....	12
1.8. ESP Course Design : .....	13
1.8.1. Needs Identification and Analysis : (NIA) .....	14
(i) Conditions of Needs Identification and Analysis : .....	15
(ii) Learners' Needs, Language Awareness and Motivation : .....	16
(iii) Types of Needs : .....	17
1.8.2. Syllabus Design : .....	20
(i) Definition of a Syllabus : .....	20
(ii) Variables in Syllabus Design : .....	21
(iii) The Design Process : .....	23
(iv) ESP Syllabus Design : .....	25



1.8.3. Materials Production : .....	27
1.8.4. Teaching .....	29
1.8.5. Assessment : .....	30
1.9. Conclusion : .....	31
<i>CHAPTER TWO : DATA COLLECTION</i> .....	33
2.1. Introduction : .....	33
2.2. Description of the Teaching/Learning Situation : .....	33
2.2.1. The Educational Institution.....	34
(i) The Status of English in the Department of Physics : .....	34
(ii) The Teaching Load : .....	34
(iii) Teaching Materials : .....	35
(iv) The Teachers : .....	36
2.2.2. The Learners : .....	36
2.3. Research Methods : .....	36
2.3.1. Description of the Target Situation : .....	37
(i) Interview with Former Students : .....	37
(ii) Authentic Uses of the Target Language : .....	38
2.3.2. Class Observation .....	39
2.3.3. Students' Questionnaire.....	40
2.3.4. Language Teachers' Interview : .....	44
2.4. Conclusion : .....	45
<i>CHAPTER THREE : APPRAISAL OF ESP IN THE DEPARTMENT OF PHYSICS</i> .....	47
3.1. Introduction : .....	47
3.2. Requirements of the Target Situation .....	47
3.2.1. Areas of Language Use : .....	47
(i) Getting information : .....	48
(ii) Undertaking a research .....	48
(iii) Reporting and publishing : .....	48
(iv) Taking part in scientific meetings.....	48
3.2.2. Settings of Language Use : .....	49
(i) The Physical Factor .....	49
(ii) Linguistic Factor.....	50
(iii) The Human Factor : .....	50
3.2.3. Language Skills .....	50



3.3. Data Analysis.....	51
3.3.1 Classroom Observation : .....	51
(i) Course Content and Conduct : .....	52
(ii) Students' Linguistic Problems.....	53
3.3.2 Students' Questionnaires .....	55
3.3.3. Teachers Interviews : .....	62
3.4. Commentary on the Main Results : .....	68
3.4.1. Learners' Lacks : .....	68
3.4.2. Learners' Wants and Expectations : .....	76
3.5. Conclusion: .....	76
 <i>CHAPTER FOUR : RECOMMENDATIONS</i> .....	 78
4.1. Introduction : .....	78
4.2. Recommendations : .....	78
4.2.1. Administrative Reforms : .....	78
(i) Pre-Sessional ESP Courses : .....	79
(ii) English in the Curriculum : .....	80
4.2.2. Important Considerations : .....	80
4.2.3. The Syllabus : .....	81
4.2.4. The ESP Course Gestation Process : .....	82
(i) Themes: .....	83
(ii) Texts Selection: .....	83
(iii) Language Activities:.....	84
a. Listening Comprehension.....	84
b. Reading Comprehension.....	86
c. Word Study.....	87
d. Structure Study.....	87
e. Language Use.....	88
f. Language Output.....	90
iv) Free Reading : .....	91
4.3. Further Recommendations: .....	91
4.3.1. Promoting Learners' Autonomy: .....	92
4.3.2. Teacher' Qualifications: .....	92
4.3.3. In-Service Teacher Education : .....	93

4.4. The Design of Sample Units .....	95
4.4.1. Sample Unit Number One .....	95
4.4.2-Sample Unit Number Two.....	109
4.4.3. Units Contents : .....	129
4.5. Conclusion : .....	130
GENERAL CONCLUSION .....	131
BIBLIOGRAPHY .....	133
APPENDICES .....	139



## LIST OF DIAGRAMS

Diagram 1.1 : Types of ESP Courses,.....	10
Diagram 1.2 : Subdivisions of ESP.....	12
Diagram 1.3 : Subdivisions of ESP.....	12

## **LIST OF FIGURES**

Figure 1.1: Environmental Factors in Course Design .....	22
Figure 1.2 : Approach to Course Design .....	28
Figure 1.3 : A Material Design Model .....	29



## LIST OF TABLES

Table 1.1 : Study and Professional Activities.....	11
Table 2.1 : Time Allocated to the Teaching of English in Different Departments .....	35
Table 3.1 : Students' Phonological Problems.....	54
Table 3.2 : Students' Sex Partition .....	55
Table 3.3 : Number of Years of English Study .....	55
Table 3.4 : Number of Years without the Practice of English after the Secondary School ....	56
Table 3.5 : Students' Self-Assessment .....	56
Table 3.6 : Importance of the Four Skills.....	59
Table 3.7 : Classification of the Four Skills in Terms of Difficulty.....	59
Table 3.8 : Teachers'ELT Experience.....	62
Table 3.9 : Students Mispronunciation of Consonants.....	69
Table 3.10 : Students Mispronunciation of Vowels .....	70

## KEY TO ABBREVIATIONS

EAP : English for Academic Purposes.

ELT : English Language Teaching.

EOP : English for Occupational Purposes.

ESP : English for Specific Purposes.

EST : English for Science and Technology.

NIA : Needs Identification and Analysis.

PSA : Present Situation Analysis.

TSA : Target Situation Analysis.



*GENERAL  
INTRODUCTION*

## **GENERAL INTRODUCTION**

The increasing importance of the English language in the world resulted in the expansion of one particular aspect of ELT namely English for Specific Purposes, henceforth ESP. As with any development in human activity, ESP was not a planned movement but rather the result of a number of converging trends namely, the enormous expansion in scientific, technical and economic activities; the advent of modern linguistics and the attention given to language functions; and, finally, the emphasis on the central importance of the learners and the consideration of their different needs and interests. Consequently, ELT saw the development of English courses for specific groups of learners according to the linguistic demands of their required area of work and/or study. Courses were to be designed in accordance to the different learners' requirements in order to sustain motivation and promote effective learning.

Therefore, ESP has become an important, if not the most important, part of English language teaching, today. Still, it is not considered as any particular language product but as an approach to language teaching in which all decisions about content and method are based on the learners' reasons for learning.

With the recognition of the diversity of learners' needs, aspirations, learning styles, levels of proficiency, expectations and motivation; a need for designing teaching materials and syllabuses as geared to particular learners was generated in many Algerian schools, universities and higher institutions. Such a need was strongly felt in the technological, scientific and economic fields where English is used as a means for access to up-to-date documents and discoveries, international meetings and conferences as well as a key for further studies and future professional careers. As a matter of fact, at the tertiary level, many departments have responded to this increasing demand for specific academic and occupational courses.

The present study attempts to give an idea of teaching English for Specific Purposes in Algeria, through the investigation of an English learning situation namely that of first-year post-graduate students reading for a 'Magister' in Physics, at Aboubakr Belkaid University, Tlemcen.

With close reference to the afore mentioned students, the researcher noticed that despite six years of English instruction, before embarking upon their post-graduate studies, they are still faced with a number of difficulties and linguistic weaknesses which hinder their English learning from being effective. Thus, the main issues of the present work revolve around three major questions :

- What are the reasons behind such difficulties and linguistic weaknesses?
- What is their impact on learners' further studies and research?
- How can the quality and effectiveness of such a teaching be improved?



With the above research questions in mind, the following hypotheses have been put forward :

With respect to the first question, the investigator thinks that the organization of English courses and their implementation at this level are hampered by some pedagogical and organizational obstacles such as the students' imperfect command of the English language, whether written or spoken, the inappropriacy of the teaching materials and the content provided to them, and the lack of training on the part of the teachers in charge of the ESP courses.

As for the second factor, (i.e., the impact of the difficulties previously cited on students' further achievements), it is highly probable that shortcomings in the teaching/learning process tend to affect negatively learners' academic and scientific achievements. In other words, a poor knowledge and command of the English language inhibits the access to the majority of the scientific resources and sources of information available. Furthermore, the learners feel unable to cope with the different demands of the target situation.

As for the third question, it is believed that a thorough consideration of the students' various needs, either in terms of the target or the learning situation, constitutes a prerequisite for the improvement and efficiency of ESP teaching situations in general.

It is hoped that this study through the analysis of the teaching/learning situation under consideration and the suggestions provided for materials production and teaching practices, this study will hopefully help in finding remedies and improving the prevailing conditions for teaching EST in particular as well as creating a considerable inducement for ESP teaching, in general.

*CHAPTER ONE*

## *Chapter One :*

# LITERATURE REVIEW

### 1.1. Introduction

The paramount importance of English as an international world language has led many countries, including Algeria, to implement it at nearly all the levels of the educational system and mainly the tertiary one. At this level, the teaching of English is, generally, directed towards specific needs of the learners in order to meet defined objectives. This is achieved through the teaching of a particular type of English, commonly known as English for Specific Purposes, or simply ESP.

Accordingly, the present chapter will try to shed some light on the main characteristics of ESP, its various subdivisions, and the process through which ESP courses are designed and conducted.

### 1.2. The Need for Literacy in English

The 21st century is increasingly characterized by the tremendous interdependence between the different parts of the world, in different fields. The enormous expansion in scientific, technical and economic activities has generated an urgent need for an international means to ensure the various exchanges in such areas. Such a duty was attributed to the English language which imposed itself as the first international language and has shifted from its previous status of colonial language, in some countries, to the position of vehicle of communication between the different nations under the label of "lingua franca". As a result, English has become the world's prime international language assuring access to scientific exchanges, technological developments and business negotiations. In short, it has become a key issue for growth in general.

The world-wide recognition of the wide-spread use of the English language and of its importance, favoured the promotion of English language teaching (ELT) in many parts of the world, and our country is no exception.

Since the early 1960's, ELT has gone through several methods and approaches. However, today's motto seems to be teaching English as a means of communication. Therefore, English teaching is seen as having a wider role to play than merely the familiarization with the civilization and culture of the target language. In this sense, Bautier (1980) states : *"A change from a mainly cultural aimed foreign language teaching towards a more practical objective has occurred."* (Bautier 1980 : 22). In sum, it is the utilitarian aspect of English at the international scale; be it economic, scientific, political or even social; which allows such a language to enjoy the place it occupies, nowadays.



In Algeria, too, as reflected in the following excerpt from the National Charter (1976), English is viewed : *"...as a means to facilitate constant communication with the world, to have access to modern sciences, modern technologies and encourage creativity in its universal dimension."* (Cited in Benmoussat 2003 : 119).

Like many young nations, Algeria is willing to extend her commercial and scientific exchanges with various countries throughout the world. For this reason, English is officially endorsed as the most important foreign language since it is introduced from the first year of the Middle School to university. However, it must be noted that, at present and particularly at the Secondary School level, the chief incentive for learning English is primarily to help pupils pass examinations (Benmoussat 2003).

At the tertiary level, the situation is somehow different. English plays and will probably continue to play a major role in the education of Algerian university students. In different fields, academic English has become a communication necessity and classes conducted in such a language are being promoted as a mean to improve students' foreign language ability. The reason is that the extent to which students can accomplish their academic or professional goals without the use of English is likely to diminish.

For this reason, and in addition to the teaching of English as the main subject within the Departments of Foreign Languages; where the students are reading for a language degree (Licence d'Anglais); other English courses are mushrooming within the formal system of education and outside it.

In many peripheral departments such as those of economics, physics, biology, chemistry and computer sciences, English instruction is also provided to equip students with the specific register and vocabulary needed in their fields of specialisation. Furthermore, English is taught in several important national organisms such as : (SONELGAZ, ENIEM, SONATRACH, SNTM, SITEL and Air Algérie) in addition to the increasing number of "outside" short English courses offered by private schools.

Yet, in such institutions (peripheral departments, national companies and private schools), one is likely to face widely varying situations but there are some common elements running through all of them. In general, the learners are highly motivated to learn English, but it is a motivation towards practical and specific uses of the language. Therefore, the courses provided in these institutions fall into a certain category of English known as English for Specific Purposes.

### **1.3. Definitions of ESP**

The history of ELT can be traced back over some centuries. However, from the 1960's onwards; others would say from the 1950's (Duan and Du 2004); no one would deny that there has been an increasing need to use the English language for the expression of knowledge within specific professional and educational fields. A clear sample of this demand is the way in which international communication takes place, no matter whether English is used in the world of science and technology or in foreign trade activities. All these demands and requirements fostered the expansion of one

particular aspect of ELT, namely the teaching of academic and professional English, more commonly known as English for Specific Purposes.

Harmer (1983) defines ESP as : *"...situations where the student has some specific reasons for wanting to learn a language."* (Harmer 1983 : 1). That is to say, in an ESP situation, the learner wants to learn the target language in order to meet specific ends.

This definition is supported by Mackay and Mountford (1978), who state that ESP

*...is generally used to refer to the teaching of English for a clearly utilitarian purpose. This purpose is usually defined with reference to some occupational requirements, (e.g. for international telephone operators)...or vocational training programmes, (e.g. for hotel and catering staff)...or some academic or professional study, (eg. engineering)...*

(Mackay and Mountford 1978 : 2)

This statement means that in ESP, English is thought to meet a specific purpose. Such a purpose rests upon the learners' occupational (such as banking) or academic (like engineering) requirements.

Robinson (1980), provides a rather similar definition of ESP by saying : *"...an ESP course is purposeful and is aimed at the successful performance of occupational or academic roles."* (Robinson 1980 : 3). In other words, Robinson, too, associates ESP learners with purposes that can be occupational or educational/ academic.

On the other hand, ESP is seen as a set of vocabulary, grammar, etc, used by speakers in a specific context. This view is held by Mackay and Mountford (1978) who consider ESP 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."* (Mackay and Mountford , 1978 : .4).

This means that the ESP learner has to acquire the linguistic repertoire related to the field he is working or studying in. For this reason, *" The nature of the relationship between context and domain and the learning and use of language is clearly vital to ESP and worth investigating."* (Robinson 1991 : 23)

Thus, ESP is not an end in itself but mainly a means to achieve such an end. Broadly speaking, it aims to increase the linguistic potentialities of a given group of learners who need English to carry out their occupations or studies. In other words, ESP courses aim to develop in the learners concerned an acceptable command of the receptive and productive skills required to understand information written or delivered in English and to communicate in this language. For this reason, ESP is considered as part of the recent trend within the ELT sphere towards a more communicative basis for teaching and learning within a given context (Escribano, 1999).



## 1.4. ESP vs. General English

As the title implies, ESP is frequently contrasted with general English; an important dichotomy is often made between these two approaches to ELT. This is clearly stated by Robinson (1980) who says :

*...the general with which we are contrasting the specific is that of general education for life, culture and literature oriented language course in which the language itself is the subject matter and the purpose of the course. The student of ESP, however, is learning English en route to the acquisition of some quite different body of knowledge and set of skills.*

(Robinson 1980, p.6)

When general English courses are provided in Middle or Secondary Schools, pupils are taught all areas of the language; that is to say, phonology, syntax, and lexis; with the priority to widen the general educational programme. In other words, learners are taught the elements of the language essential to any language program. (Broughton 1981).

Furthermore, learners' sole objective; at these levels ;i.e. Middle and Secondary Schools; is, in fact, merely to pass examinations and tests, whether they are sufficiently fluent in the English language or not. This type of teaching has the weakness of being, generally, not successful and nearly ineffective since it does not cater for the learners' immediate and operational needs as opposed to ESP.

In addition to that, general English courses are known to be, at least in practice, "language- centred" since the teachers are more concerned with transmitting their message than meeting their learners' needs and expectations.

In an ESP context, things tend to be somehow different. ESP has become an important, if not the most important, part of ELT, today. Still, it is not considered as any particular language product but as an approach to language teaching in which all decisions about content and method are based on the learners' reasons for learning. Thus, it is possible to sort out some common features criterial to ESP courses.

ESP is, first, goal-directed. Students generally study English for particular reasons connected to their present/future careers as students or professionals. This has, therefore, implications for the type of learning materials designed for them.

Second, in order to design relevant materials for a given work or specialist study, ESP teachers have to carry out a needs identification and analysis. The aim behind such a process is to determine what the students expect or are expected to do in the target language.

Additionally, ESP courses are, generally, allotted very specified time period. Hence, course objectives are to be clearly defined and realized during the time available.



Furthermore, it is often assumed that the students of an ESP course are likely to be adults rather than children. Therefore, they are supposed to have had some knowledge of English required in a school situation; ie. general English courses; and are well aware of their purpose in learning the target language. This idea is supported by Kennedy and Bolitho (1984) who write :“ The older a learner is, the more likely he is to have his own definite ideas on what and why he is learning English...the utility of learning English is likely to be more apparent.” (Kennedy and Bolitho 1984 : 13 -14).

In the same vein, Sculthorpe (1980) posits : “ *The language learner on an intensive language course is highly conscious of himself and his purpose.*” (Sculthorpe 1980 : 26).

However, ESP can also be taught in some vocational Secondary Schools or even bilingual schools to students who are beginning their study of the language (Robinson 1991).

Finally, what can be said to be criterial to ESP courses, too, is that they are designed for identical students generally involved in the same kind of work or studies. However, this does not exclude the fact that there may be many ESP mixed classes with identical students in terms of job or study needs but different in terms of duties and the pace at which they learn English.

These are the main aspects which characterize ESP from general English courses. However, several writers have shown their doubt about the validity of such a dichotomy like Stevens (1977) who admitted the difficulty of drawing a line between general English and ESP, and Kennedy and Bolitho (1984) who advised not to view ESP as a different area from general English.

## **1.5. The development of ESP Teaching Theories**

ESP is a pedagogy in which the syllabus, contents and methods are determined according to the learners' specialised subjects (Duan and Du 2004). However, ever since its appearance in the 1960's, ESP has adopted several teaching theories; in other words, it has experienced several phases of development. This view is supported by Swales, quoted in Smoak (2003) when saying : “ *The way we view the field of ESP today is far different from the way we viewed it in the 1960's*”. These major shifts in orientation have come about largely because ESP has developed at a time when fundamental revision of peoples' view of language and learning has been taking place.

At first, ESP was primarily concerned with Register Analysis. Its aim was to identify the linguistic features (grammar, vocabulary,...etc) of the various specific registers which were, later, taken as the basis for syllabus design.

This first step of ESP development, which focussed mainly on language at the sentence level, has been rapidly influenced by new considerations in the world of linguistics. Previously concerned with language usage, ESP shifted attention above the sentence level and became closely involved, in the 1980's, with the emerging field of

Discourse Analysis. The target of such a procedure was to understand how sentences are combined, and the linguistic methods used to determine the modes of organization, to form a meaningful whole. In other words, through Discourse Analysis, the form of the language was related to its use (Evans and St John 1998).

Following, Target Situation Analysis held that the purpose of an ESP course is to enable learners to function adequately in a target situation. Therefore, the ESP course design should proceed by identifying the target situation, first, and then carrying a rigorous analysis of the linguistic features of that situation. Such a process is usually known as needs analysis.

ESP knew a radical change during its fourth stage of development. It was no more concerned with the surface forms of the language but rather with the thinking processes governing language use, with the appearance of the skills-centred approach. The principle idea behind such an approach was that there are shared reasoning processes and interpreting strategies underlying all language (Hutchinson and Water 1987). Such abilities enable learners to extract meaning from discourse without focussing on the surface forms of the language such as guessing the meaning of words from the context in which they are used.

All the stages outlined so far have been fundamentally concerned with the descriptions of language use, however, with the growing awareness of the central position the learner occupies in language learning, in general, ESP adopted the Learner-centred approach as the underpinning of course design. Hence, the learner started to be considered as an active actor of the teaching learning/process whose needs have to be defined with reference to his present or future real uses of the English language. Accordingly, in such an approach, the teacher, as Tudor (1993) put it, will need to : ***"...get to know the students well enough to be able to understand both their intentions (what they need and would like to do) and their resources (what they are able to do)."*** (Tudor 1993 : 24)

Thus, usefulness and effectiveness of the language course will be reached only if the English language samples are based upon the objectives of instruction. Consequently, it has become vitally important that learners should be properly educated and trained in English for the kind of practical use they will have to put the language to. Language has become, therefore, considered in terms of its content and appropriateness to various learners' needs.

Despite its relatively brief history, ESP has witnessed numerous major shifts in its development. Changes in theory, first, which resulted in the elaboration of different teaching methods and materials but most notably the move from a language to a learner-centred approach.

## **1.6. Types of ESP**

The development of ESP has led to its subdivision into many sub-sections. Nevertheless, it has become common to make a distinction between two main branches



of ESP namely English for Academic Purposes (EAP); which began as the dominant branch; and English for Occupational Purposes (EOP). However, in the last few years, a third subdivision of ESP has come to the fore, very rapidly, called English for Science and Technology (EST).

### **1.6.1. English for Academic Purposes : (EAP)**

EAP is a study-oriented branch of ESP (Mc Donough, 1984). It shows the learner how to study through the medium of English. In the same vein, Robinson (1980) posits : *“English for Academic Purposes or study skills, ie. how to study through the medium of English regardless of the subject matter or of the studies.”* (Robinson 1980 : 7).

EAP courses aim to help the students specialise in a particular field of study in an educational institution so as to be able to update knowledge and keep abreast of the latest developments in their specialities. This is supported by Kennedy and Bolitho (1984) who write that : *“EAP is taught generally within educational institutions to students needing English in their studies.”* (Kennedy and Bolitho 1984 : 4).

This part of English language teaching involves the learning of specific skills such as listening to lectures, note taking, reading in the specialised field, writing reports and research articles, taking part in group discussions, maintaining a point of view, interpreting graphs, diagrams and tables, and so on.

### **1.6.2. English for Occupational Purposes : (EOP)**

English may also be required in employment situations, thus, its teaching is activity-oriented and this area of ESP is referred to as English for Occupational Purposes. In this sense, Kennedy and Bolitho (1984) write : *“EOP is taught in a situation in which learners need to use English as part of their work or profession.”* (Ibid).

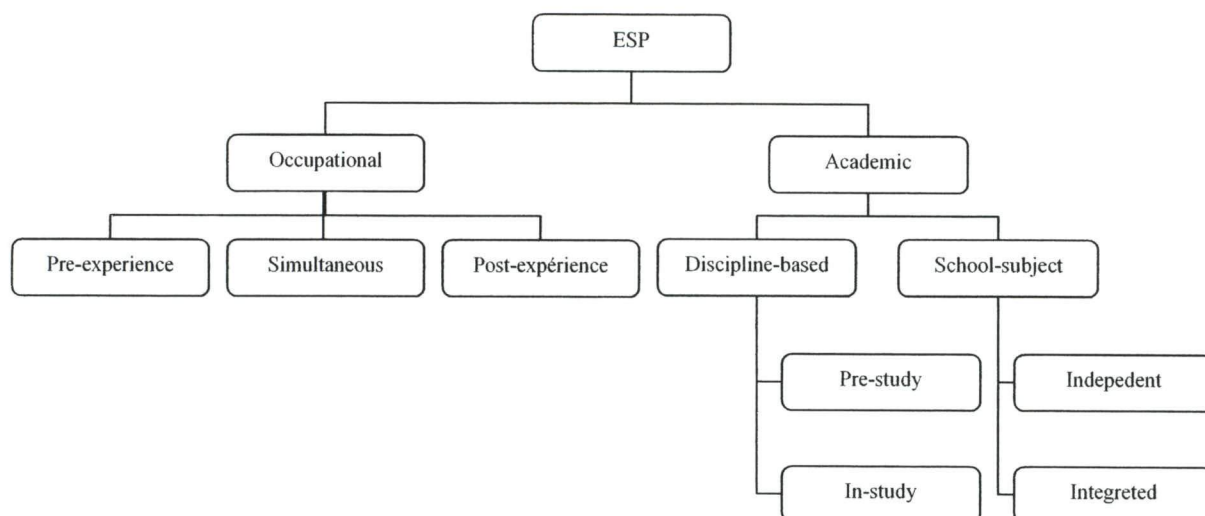
Thus, EOP applies more to every day needs of working people. To illustrate this point, we may say that a businessman will need English to specialise in commercial language.

### **1.6.3. EAP vs. EOP :**

Robinson (1991) differentiates between EAP and EOP by stating : *“EAP is thus specific purpose language teaching, differentiated from EOP by the type of learner : future or practising student as opposed to employee or worker.”* (Robinson 1991 : 100).

Each of EAP and EOP courses include different types of language training that can precede, follow or be simultaneous with the studies or occupation. This is clearly summarized in the following diagram :





**Diagram 1.1 : Types of ESP Courses,  
Source : Kennedy and Bolitho 1984 : 5, adapted from Stevens 1977**

Within EOP, we distinguish three types of language courses :

- Pre-experience : English courses precede the training.
- Simultaneous : English is learnt during the training.
- Post-experience : English learning follows the training.

Speaking about EAP, the language training is either :

- Discipline-based : here again, the language training can either precede (pre-study) or be simultaneous (in-study) with the specialisation, or
- A school-subject, where a distinction is made between independent and integrated language courses. In the former, English is isolated from the other courses whereas in the latter, English is integrated in one or more courses.

To end this classification, it is worth mentioning that each situation implies a kind of “content knowledge” that the ESP practitioner is required to deploy and, a degree of generality or, by contrast, specificity of the ESP course (Robinson, 1980).

Furthermore, when we come to look at the skills that students in any field need, it is arguable that they may be very similar to the skills needed by professionals in the same field (Blue, 2001). The table below is an attempt to show some of the similarities that may exist. Study activities and the corresponding professional activities both draw on essentially the same language skills. Thus, students may be expected to attend lectures and seminars, whilst professionals might take part in presentations and meetings. The language skills needed might be very similar through.

<i>Study Activities</i>	<i>Skills Required</i>	<i>Professional Activities</i>
Lectures	Listening to understand content, listening for key words and phrases, making notes, asking questions.	Presentations
Seminars	Asking and answering questions, understanding and expressing different points of view, reporting on work done, making notes.	Meetings
Reading textbooks, articles, etc.	Understanding the overall content, distinguishing main points from supporting detail, skimming, scanning, evaluating, making notes.	Reading Reports
Writing essays, dissertation	Construction of reasonably accurate sentences and paragraphs, good organization of ideas.	Writing reports, letters, etc.

**Table 1.1 : Study and Professional Activities**  
**Source: Blue (2001)**

#### **1.6.4. English for Science and Technology : (EST)**

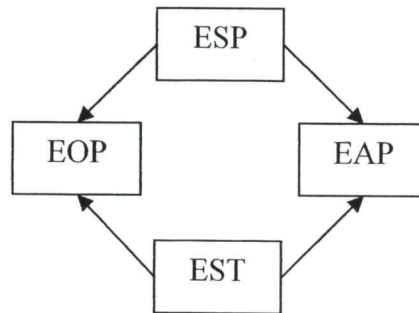
EST grew out of the demand of “...*scientists and technologists who need to learn English for a number of purposes connected with their specialities.*” (Kennedy and Bolitho 1984 : 6).

In short, it is simply a subdivision of ESP dealing with scientific content. The teacher’s role is, therefore, to show the learners how the scientific or technological knowledge formerly acquired in their own language, can be performed through or transferred to English. This point is clearly explained by Widdowson (1979) who states that, “*a knowledge of EST can derive from what the student knows of science and the functioning of his own language in association with what he has learnt of English usage.*” (Widdowson 1979 : 45).

Some writers like Kennedy and Bolitho (1984), Carver (1984), and Miliani (1984) consider EST as an individual branch of ESP, others such as Robinson (1980), Mc Donough (1984), Stevens (1977) and Blue (2001) maintain that EST is a sub-branch shared by EAP and EOP depending on the area English would be used for. Echoing this view, Blue (2001) writes : “*English for science and technology cuts across for occupational purposes and language for academic purposes, as it has both occupational and academic applications.*”

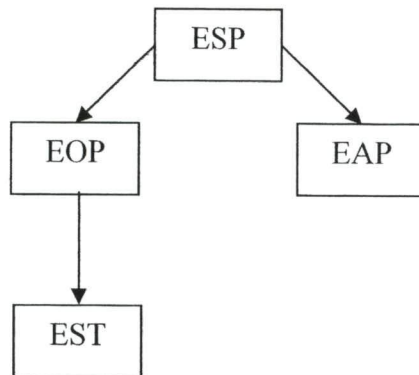
Hence, EST can be either curriculum-oriented if it is applied in the formal educational system or activity-oriented if it involves a specific activity outside this

system. The diagram below will explain how these three branches EAP, EOP and EST are related to each other :



**Diagram 1.2 : Subdivisions of ESP**

Mc Donough (1984), however, considers EST as a sub-branch of EAP maintaining that EST is academically oriented, as illustrated in the following diagram:



**Diagram 1.3 : Subdivisions of ESP**

**Source: Mc Donough 1984 : 6**

### **1.7. English and Science:**

It is worth mentioning that one of the most important features one can notice over the past few years is the increasing wide use of the English language by any scientific or technical community. Any scientific knowledge is transmitted through international seminars, conferences and specialised journals via the English language which has become necessary to all scientists to keep abreast of the latest scientific advances all over the world, as well as to write up and communicate their own research to an international audience.

This view is supported by Ammon and Hollinger (1992) who note :

*English has become so dominant as the international language of science, especially of scientific publications, that its use seems to be*



*necessary if one wants to be read or discussed outside of one's own country.*

(Armon and Hollinger 1992 : vii).

Besides, Crystal (1997 : 2) reports that as long as 1981, well over 80% of scientific articles were written in English.

An important aspect to be pointed out, at this level, is that most scientific findings are communicated by making use of a rather specialised type of English namely that of science and technology, i.e. EST. Therefore, ESP learners, including EST ones need to be taught a certain vocabulary, specific forms and functions, and how these interrelate to produce coherent texts. After all, what a scientist does when speaking or writing is performing a series of acts like describing, defining, classifying, exemplifying, comparing, hypothesizing, generalizing, concluding and the like; therefore, the learner has to be taught how to recognize such functions and how to produce the appropriate form to express a particular function.

A scientist is not seeking to arouse emotions or to present beauty, but only to make himself understood leaving aside as little margin for error as possible, using a language in which each term conveys a meaning steadily fixed and vigorously limited.

By contrast, for our every day vocabulary, the meaning of a word is often vague and indeterminate, needing more and more help from context if the meaning is to be grasped. Words in isolation may, then, be inadequate as tools for exact and logical communication. But, this power of exact and logical communication is the first requirement of the scientist. He needs to use words that have a precise meaning and one meaning only, and which enable him to express his ideas with no possibility of ambiguity or confusion. He must know exactly what his words mean and he must be able to rely absolutely on his hearers/readers attaching to a particular word exactly the meaning which he attaches to it. Otherwise, his production would be considered as pure literature and would lead to a lowering regard of his research. Scientific English is, thus, viewed not so much as a matter of preference but as a communicative necessity in the world of science, in general.

Ordinary vocabulary; with its vague boundaries to the sense of common words; is obviously, therefore, of no use when scientific precision is required. Thus, we must admit the need of the scientist for a specialised vocabulary.

## **1.8. ESP Course Design :**

English is regarded as a medium of access to technology and international communication. The aim of ESP is, then, to develop in the learners an acceptable command of the receptive and productive skills required to understand information written or delivered in English and to communicate in that language. To reach this end, several operations have to be undertaken. In practical terms, this entails

*...the use of the theoretical and empirical information available to produce a syllabus, to select, adopt or write materials in accordance with the syllabus, to develop a methodology for teaching those materials and to establish evaluation procedures by which progress towards the specified goals will be measured.*

(Hutchinson and Waters 1987 : 56)

In other words, Hutchinson and Waters (1987) describe an ESP teaching operation as consisting of five essential and interrelated phases, namely :

- The identification of needs
- Syllabus design
- The production of materials
- Teaching
- Evaluation/Testing

Hence, in order to plan suitable teaching materials for the ESP teaching situation, an essential parameter has to be first considered. It concerns the identification and analysis of learners' needs. These needs will, then, act as a guide to the design of a syllabus, course materials as well as teaching and testing methods.

### **1.8.1. Needs Identification and Analysis : (NIA)**

Hutchinson and Waters (1987) define ESP as : *"...an approach to language teaching which aims to meet the needs of particular learners."* (Hutchinson and Waters 1987 : 21).

Thus, ESP is not an end in itself, but a means to achieve an end. Broadly speaking, the purpose of ESP is to increase and develop the linguistic potentialities for a specific group of learners who need to perform their activities and/or studies.

The immediacy of the purpose and its specificity are taken to be central to ESP. As a consequence, the concept of needs analysis is essential in such an approach. In this specific context, Robinson (1991) state that needs analysis is generally regarded as criterial to ESP.

Furthermore, Robinson (1980) adds " *...an ESP course is purposeful and is aimed at the successful performance of occupational or educational roles. It is based on a rigorous analysis of students' needs and should be tailor-made.*" (Robinson 1980 : 13).

Thus, needs analysis is not only considered as a characteristic of ESP but more than that, it is the basis upon which teaching materials will be selected since it is through this step that learners' needs are weighed up and implemented (Martinez and



Megan, 2003). In this respect, Senhadje (1993) notes : ” *If you define the need, you define the content of the course.*” In other words, ESP is characterized by its content (science, medicine, commerce, etc) but most importantly by a definition of a particular need of the learner.

Needs are always defined as the requirements that the learners have in order to be able to communicate effectively in the target situation. Therefore, ESP has its basis on an investigation of the purposes of such learners and the set of communicative needs arising from these purposes. Alongside with this, such phase takes into account learners’ personal, socio-cultural and educational traits, their capacities, expectations and interests in the language, the equipments they have to deal with and, above all, the content and objectives of their studies as well as the appropriate way of achieving such objectives.

Long (1996) cites four reasons for performing needs analysis. These are :

- Relevance : to determine the relevance of the material to the learners’ situations.
- Accountability : to justify the material in terms of relevance for all parties concerned (teacher, learner, administration, and so on).
- Diversity of learners : to account for differences in learner needs and styles.
- Efficiency : to create a syllabus which will meet the needs of the learners as fully as possible within the context of the situation.

#### **(i) Conditions of Needs Identification and Analysis :**

Long (1996) stresses the fact that, when performing a NIA, three important factors have to be taken into consideration; which are :

##### **a. Sources :**

Major sources for needs analysis are :

- Previous needs analyses; which can provide working examples as well as valuable insights into needs of students in similar programmes and with similar experiences
- Students themselves
- Applied linguists; good sources for language requirements
- Domain experts; often referred to as insiders. This may include the ESP teacher, subject specialists or students who have previous experience in dealing with the target situation.



### **b. Triangulation :**

Cross checking of data provided by at least three of the above sources is important, and adds to the validity of the needs analysis. This stems from the fact that the needs of a given group of learners may be perceived very differently from various angles. Thus, needs analysis should not be unilateral (Smoak 2003).

### **c. Multiple methods :**

A simple method of gathering information may not provide a complete picture of the situation under study. In this sense, Basturkmen (1998) defines needs analysis as : *"...the identification of difficulties and standard situations by observation of participants functioning in a target situation in conjunction with interviews and questionnaires."*

Collecting data through various methods may add essential insights and help obtain a more realistic picture of the target situation (Bacha 2004).

Moreover, it has been standard practice to conduct as much of the needs analysis as possible before the start of the ESP course. However, Richterich and Chancerel (1980) and others consider needs analysis to be an on-going and dynamic process which starts with the beginning of the course and is conducted over and over because they believe that the learners' needs may change during the course. Similarly, Hutchinson and Waters (1987) argue that, *" it is also important to remember that needs analysis is not a once for all activity. It should be a continuing process in which the conclusions drawn are constantly checked and re-assessed."* (Hutchinson and Waters 1987 : 59)

Hence, the more frequently and regularly a needs identification and analysis is conducted the more benefits will be drawn from the course.

### **(ii) Learners' Needs, Language Awareness and Motivation :**

As started by Robinson (1991), the students of an ESP course are likely to be adults rather than children (See 1.4.). Additionally Hutchinson and Waters (1987) state : *"What distinguishes ESP from general English is not the existence of a need as such but rather an awareness of the need."* (Hutchinson and Waters 1987 : 53).

Thus, ESP teachers are, generally, faced with learners who already have some knowledge of English required in a school situation and who are supposed to be well aware of the reason why they need to learn English. In the same vein, Sculthorpe (1980) notes that the Language learner on an intensive language course is highly conscious of himself and his purpose.

Therefore, ESP learners are supposed to be highly motivated since their perceived needs are responded to through the language course (Jordan 1997). Additionally, the relationship between what they are learning in class and what they need to use the language for is obvious and highly stressed.

Hutchinson and Waters (1987) have clarified this point by saying : “ *The assumption underlying this approach was that the clear relevance of the English course to their needs would improve the learners’ motivation and thereby make learning better and faster.*” (Hutchinson and Waters 1987 : 8) .

In other words, in the ESP context, the more close and overt the association between an activity and a perceived need is, the less time is likely to be wasted and the more students will be motivated to learn. Furthermore, it is stated that : “*Practitioners tend to assume that ESP is likely to go hand in hand with certain patterns of motivation.*” (Mc Donough 1984 : 24) .

The most influential work on motivation in language learning has been carried out by Gardner and Lambert (1972). They identified two types of motivation namely instrumental motivation and integrative motivation. These are, respectively, described by Brown (1993) as:

*Instrumental motivation refers to motivation to acquire a language as means for attaining instrumental goals...An integrative motive is employed when learners wish to integrate themselves with the culture of the second language group, to identify themselves with and become a part of that society.*

(Brown 1993 :153-154)

Since most ESP learners feel that English is, generally, a need before being a want to them, it is the former type of motivation which characterizes them. This idea is clearly stated by Broughton (1981) who says : “*When anyone learns a language instrumentally, he needs it for operational purposes...the tourist, the salesman, the science student are clearly motivated to learn English instrumentally.*” (Broughton 1981 : 62) .

Furthermore, it is generally assumed that ESP programmes, by their nature, tend to emphasize the instrumental aspect of a student’s motivation (Kennedy and Bolitho, 1991). However, Gardner and Lambert (1972) have a less rigid view vis-à-vis the more relevant form of motivation to ESP learners.

### **(iii) Types of Needs :**

The term “needs” is often used as an umbrella term covering several interpretations (Richterich 1983; Hutchinson and Waters 1987). However, different ESP specialists (Hutchinson and Waters 1987, Robinson 1991, West 1993) agree on the existence of two types of needs, namely, target needs and learning needs. This classification is also expressed by Senhadje (1993) who states : “*We analyse the learners’ needs by distinguishing target needs and learning needs.*”



### a. Target Needs :

Target needs represent what the learners need to do in the target situation, .i.e. they are the requirements of the academic or occupational situation the learners are prepared for. This term hides, in practice, a number of further important distinctions which are : necessities, lacks and wants.

#### *Necessities :*

They refer to the learners' study or job requirements, that is to say, what they have to be able to do at the end of their language course in order to function effectively in the target situation. Needs in this sense are perhaps more appropriately described as "objectives" (Robinson 1991, West 1993).

#### *Lacks :*

Lacks are defined as being the gap between the existing language proficiency of the learners and the one required in the target situation. Thus, they represent what the learners do not know or can not do in English. It is, then, lacks which will determine course content.

#### *Wants :*

They represent what the students themselves would like to gain from the language course. Therefore such needs may be said to be personal aims and are sometimes referred to as "subjective needs" (West 1993).

It is often pointed to the fact that learners' wants may differ from or even conflict with the necessities of the target situation and the lacks identified by the teacher. Nevertheless, the teacher has to consider learners' suggestions and personal aims in order to determine syllabus content.

### b. Learning Needs :

The analysis of the target situation can reveal what people do with the language learned. But, this is not enough, what we also need to know is how people learn to do what they do with this language. Consequently, the 1980's saw the extension of needs analysis from "What" into "How". In this context, James (1984) states : "*Language tutors specifically need to know the preferred learning styles...their students hold when they learn a language.*" (James 1984 : 8).

In short, learning needs are what the learner needs to do in order to learn. They seek information about the learning situation which include data about the conditions of



the learning situation, the learners' knowledge, skills and strategies, their motivation, the resources available (staff, accommodation, time load, and so on), the prevailing attitudes or culture, the materials, aids and methods available, and finally the aims of the course.

In order to seek the same type of information, Robinson (1991) mentions three areas of research. In addition to Target Situation Analysis (TSA); previously mentioned as Target Needs, she suggests Present Situation Analysis (PSA) and Language Audits, maintaining that : *"A Present Situation Analysis seeks to establish what the students are like at the start of their language course, investigating their strengths and weaknesses."* (Robinson 1991, p.9).

Present Situation Analysis enables the investigator to look for the students' actual level of proficiency in the target language and to determine their lacks, at the same time. It also seeks information about students' attitudes vis-à-vis the target language and the resources available.

Richterich and Chancerel (1980) suggest three sources of information for a PSA which are :

- The students themselves
- The language teaching establishment
- The user-institution (such as the students place of work)

(Richterich and Chancerel 1980, quoted in Hutchinson and Waters 1987, p.102)

For Robinson (1991), needs analysis may be seen as a combination of TSA and PSA, the findings of which are, then, used as input data for the syllabus design stage.

Concerning the Language Audit, most commonly used to determine the role held by a foreign language in a commercial or industrial enterprise, the investigator must :

- Determine the language skills needed to carry out specific jobs or studies (West 1993)
- Assess the current staff capabilities, by means of tests, to specify the different levels of achievement of various tasks
- Determine the amount of language training which is needed in terms of time and facilities required in order to bridge the gap existing between the present performance and the required performance in the target language.

Despite the variety of approaches suggested to identify students' needs, all the researchers mentioned above agree on the collection of the same type of information during the needs analysis phase. These pieces of information concern :

- The target situation, the course designer has to look for the requirements of the target situation through the investigation of the type, the amount and the level of performance required in the target language.
- The learners, the investigator has to consider their present language ability so as to determine their lacks, analyse what they would gain from the ESP course, i.e. their wants, and analyse their attitudes vis-à-vis the language course.
- The learning environment which reveals important information about the learning conditions, the teaching conditions, the resources available, the type of setting and finally the time load.

The collected data allow the planning of effective syllabuses and teaching materials.

### **1.8.2. Syllabus Design :**

Through there is an enormous literature on syllabus design, it remains a difficult task to be fulfilled. Hence, before designing the model that best meets the requirements of a given situation, one needs to start from a theoretical basis finding out what is exactly meant by a syllabus.

#### **(i) Definition of a Syllabus :**

The syllabus is composed of the subjects, the language structures and tasks that should be studied in a particular course. This is clearly stated by Hutchinson and Waters (1987) who define the syllabus as : *"...a document which says what will (or at least what should) be learnt."* (Hutchinson and Waters 1987 : 80).

Moreover, Yalden (1987) posits :

*The syllabus is now seen as an instrument by which the teacher, with the help of the syllabus designer can achieve a certain coincidence between the needs and aims of the learners and the activities that will take place in the classroom.*

(Yalden 1987 : 86)

For Yalden, the syllabus is an organization of the learners' needs and aims into a number of activities which will constitute the content of courses.

Furthermore, Corder (1973) puts :

*A finished syllabus is the overall plan of the learning process. It, too, must specify what components or learning items must be available or learned by a certain time and what is the most efficient sequence in which they are learned.* (Corder 1973 : 296)



Hence, the syllabus is a plan of work which acts as a guideline for the teacher. It determines the content of the course, i.e. language structures, subjects and tasks, that is to be taught and the way in which such a content has to be organized. In sum, one of the main purposes of the syllabus is to make explicit the linguistic content of teaching in a particular situation and to break down the mass of knowledge to be learned into manageable units.

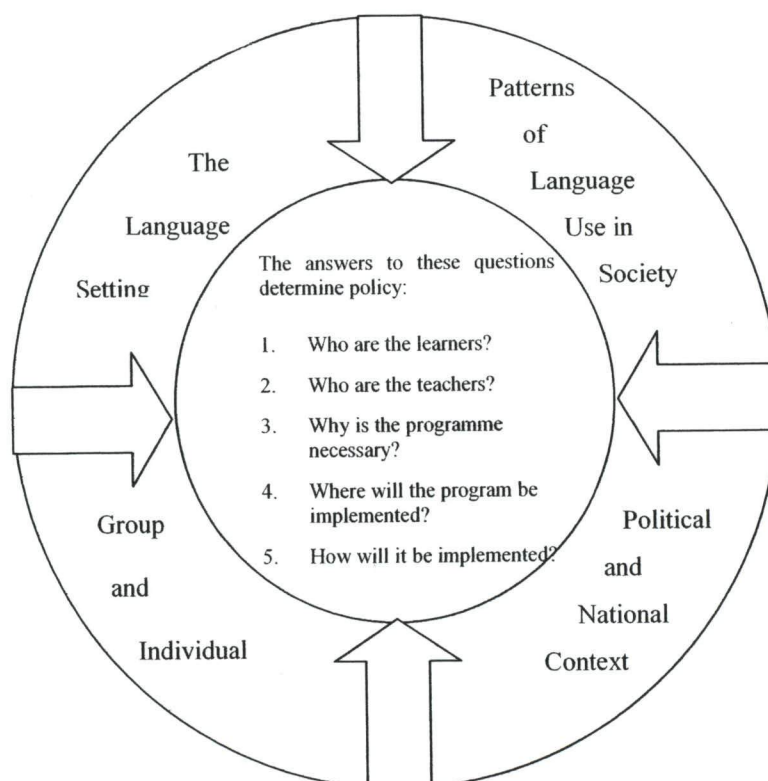
### (ii) Variables in Syllabus Design :

Language is a complex entity and can not be taught in one go. Through syllabus design, course content is provided and arranged for an effective teaching/learning process. However, before the design process, a set of criteria have to be taken into consideration. In this sense, Allen (1984) reveals :

*Since language is highly complex and cannot be taught all at the same time, successful teaching requires that there should be a selection of material depending on the prior definition of objectives, proficiency level and duration of the course. This selection takes place at the syllabus planning stage.* (Allen 1984 : 65)

Thus, course objectives, learners' actual knowledge and time allotment are to be highly considered when designing a syllabus. Other methodological consideration are taken into account notably learners' learning styles and the pedagogical approach (Brumfit, 1984).

Besides, Dubin and Olshain (1986) mention a number of environmental factors, said to influence syllabus design, and which are summarized in the following figure :



**Figure 1.1: Environmental Factors in Course Design**  
Source : Dubin and Olshain 1986 : 6



On the one hand, the syllabus design is greatly influenced by a set of environmental constraints, namely :

- The language setting, which concerns the status of the language in the community in which it is used (it can be the mother tongue, a second language or a foreign language).
- The areas of language use in society.
- The role of the language in the political life taking into account the country's economy and technology (Asworth, 1985).
- Learners' attitudes towards the language. This depends on their degree of awareness of the language.

On the other hand, the answers provided to the questions inside the circle supply information about the teaching/learning situation. They embody part of the analysis of both the target situation and the learning situation.

Miliani (1994), on his part, has summarized four essential points that have to be taken into account before designing a syllabus. These are :

- Situation analysis.
- Setting aims and objectives.
- Generating Syllabus content.
- Assessment

Situation analysis deals with the educational institution and the means it provides in terms of finance, teaching materials and staff. It also provides a learners' profile including their motivation and attitudes towards the language course as well as the teachers' profile covering their attitudes towards the course and their professional "know-how".

Aims and objectives are set as a result of learners' needs analysis. The aims are defined at a broad level as general statements, while objectives refer to what the learners have to achieve at the end of their learning experience.

When generating syllabus content, four criteria are considered :

- Validity : the language of the syllabus has to be authentic and acceptable.
- Significance : the syllabus content has to cater for the aims and objectives set.
- Interest : the content should arouse and sustain learners' interest.
- Learner ability : syllabus content should not go beyond learners' level of competence.

Furthermore, the content of the syllabus has to be flexible enough to allow for eventual revisions as learners' needs are subject to change. (See 1.8.1-i)

Finally, assessment allows the evaluation of learners' degree of acquisition, course objectives, teaching techniques, and the syllabus itself.

Miliani (1984) notes that the relation between the studied factors is cyclical. A failure in the designed programme would, therefore, probably mean that a deficiency has occurred when dealing with one of the four points previously mentioned.

### **(iii) The Design Process :**

#### **a. Setting Objectives :**

The general goals for which a given language programme is being taught or learned are generally embodied within the curriculum. They provide a rationale for the syllabus or course designer in the sense that they dictate the type of communicative and pedagogic objectives which are both appropriate and feasible for the educational system in question. In this sense, Dubin and Olshtain (1986) maintain that :

*A curriculum contains a broad description of general goals... A syllabus is a more detailed and operational statement of teaching and learning elements which translates the philosophy of the curriculum into a series of planned steps leading to more narrowly defined objectives.*

(Dubin and Olshtain 1986 : 34)

Therefore, the production of the syllabus involves the syllabus designer to determine the objectives from the curriculum generalized goals since :

*Goal statements are relatively imprecise. While they can act as general signpost, they need to be fleshed out in order to provide information for course and programme planners. This can be achieved through the specification of objectives.*

(Nunan 1988 : 61)

The design of a programme to a learning requirement begins by a careful determination of the learning objectives followed by the working of a relevant syllabus and the elaboration of a course based on it, in relation to learners' attainment and needs.



In other words, setting objectives is an integral part of syllabus production. They can be useful, not only to guide the selection of content (structures, functions, notion, tasks...) but also to give a sharper focus for teachers, to give learners a clear idea of what they can expect from a language programme and to help in developing means of assessment and evaluation.

As this level, it is worth mentioning that, in the real world, if one looks at the language programmes in operation, it is not impossible to find many situations where an operational guide on the syllabus level does not contain a statement of more general goals, (i.e. we may have a syllabus without a curriculum). However, absence of concrete statement about policy does not indicate that goals are totally missing. More likely, it may mean that the general goals are presented by the beliefs and attitudes of teachers and administrators in the programme and learners needs, even through there is no written curriculum. This is generally the case in ESP teaching/learning situations.

### **b. Selecting and Grading Content :**

Setting objectives paves the way for the selection and production of the necessary content. Such a content covers the language forms and functions needed by the learners to cater for the requirements of the target situation, and will be presented within suitable activities. This means that there should be a congruence between syllabus objectives, learning content and activities, in order to reach course effectiveness. In this sense, Nunan (1988) argues :

*There is a desirability of relating classroom activities to syllabus goals and objectives so that courses and programmes derived from such syllabus have an overall coherence of purpose. Failure to provide links between goals, content and learning activities can lead to a situation in which the desired outcomes of a programme are contradicted at the classroom level.*

(Ibid : 67)

As well as listing what should be learned, a syllabus can also state the order in which it is to be learned ((Hutchinson and Waters, 1987). This means that the content selected to meet course objectives has to be organized in a gradual manner in order to be more efficient. In the same vein, the former writer posits : *“Grading...is one of the central steps in syllabus construction...any proposal failing to offer criteria for grading and sequencing can hardly claim to be a syllabus at all.”* (Ibid., :67).

Moreover, activities which can be exploited at different levels of difficulty are more useful than those which are only suitable for a single proficiency level.

### **c. The Choice of the Syllabus :**

A syllabus is normally organized according to the principles of a given pedagogical approach. However, the existence of various approaches results in the



existence of different types of syllabus, three of which are most frequently used. They are :

- The structural, grammatical or linguistic syllabus : centred around the teaching of structures and grammatical items.
- The functional/notional syllabus : based on the teaching of functions and notions.
- The situational syllabus : based on the teaching of tasks and functions through specific situations.

These are the most widely used types of syllabus. Nevertheless, other kinds of syllabus, based on other different approaches, exist as well.

Course designers who carefully consider the various approaches to syllabus design emphasize the fact that a set of syllabuses need to be combined and integrated in an eclectic manner in order to bring about positive teaching and learning results. In this respect, Swan (1985) says : “ *The real issue is not which syllabus to put first : it is how to integrate eight or so syllabuses...into a sensible teaching programme.*” (Swan 1985 cited in Hutchinson and Waters 1987 : 89).

Therefore, any teaching material must, in reality operate several syllabuses at the same time. One of them will, probably, be used as the principle organizing feature, while the others are still there even if they are not so apparent. Otherwise, a syllabus framed only on one aspect; be it structures, functions, situations, tasks or whatever; will in all probability miss the opportunity to develop the acknowledged elements efficiently.

Designing a syllabus is not an easy task to fulfil. Besides, the role of the syllabus is a complex one, but it clearly satisfies a lot of needs. Its importance stems from its multi-functional purpose. Hence, one needs to be crucially aware of the different functions the syllabus fulfils so that it can be designed and used most appropriately. The syllabus is also an important document in the teaching learning process in the sense that it provides a set of criteria for materials production, teaching and testing. As such, it should not be rigid but flexible, not closed but open-ended, and not static but subject to constant revision as a result of feedback from the classroom, in order to maximize the aims and process of learning.

#### **(iv) ESP Syllabus Design :**

It is difficult in considering syllabus design to separate the issues found in general language programmes from those that arise in specific purposes courses. However, ESP learners need to use English appropriately in order to handle communication acts in the target situation. Therefore, syllabus designers; in this case the ESP teachers themselves (see 1.8.2 – ii – a); try to plan suitable teaching syllabuses and materials for the ESP teaching situations. Such syllabuses are constructed on the

target needs as formulated by the students and analysed by ESP teachers and subject specialists on the one hand, and the resources available, on the other hand.

Robinson (1991) advocates a rigorous needs analysis, as a first step, so as to design appropriate ESP syllabuses. During this phase, the necessary data is collected concerning the requirements of the target situation, learners' needs, lacks and wants, the educational setting, the resources available and the type of content required. In other words, needs analysis is the starting point from which all aspects of the ESP teaching/learning process are derived, since through this step course objectives are determined. This is clearly stated by Robinson (1991) who posits that : ***"as a result of needs analysis, we should be able to draw up our objectives of the ESP course."***  
(Robinson 1991 : 17)

Setting objectives is an integral part of syllabus design (See 1.8.2 – ii). They allow the selection and production of appropriate content. Moreover, the ESP teacher has to ***"...contrive a systematic and progressive syllabus"*** (Senhadje 1993). This means that the content selected has to be graded before being taught.

Close quoted in Mc Donough (1984) summarizes three hierarchical steps through which an ESP course is built :

***A foundation that could serve for any purpose (would refer to as common core)***

***A super structure that could serve for any scientific purpose.***

***A later superstructure that could serve for some special scientific purpose.***

(Close quoted in Mc Donough 1984 : .54)

Since the aim of ESP courses is to enable learners to handle effectively the communicative tasks required by the target situation, it is necessary to provide syllabuses whose content enables to acquire the necessary language knowledge. To achieve this purpose, Yalden (1987) suggests that :

***One might begin with grammar and pronunciation only, as one does in a structural approach, but introduce work in the language functions, and in discourse skills fairly early, and in time increase the component of the course.***

(Yalden 1987 : 94)

It is, thus, necessary to present different aspects of the language knowledge in an eclectic manner so as to enable learners to use the target language appropriately. It may be possible to use a structural/situational syllabus as a point of departure of the course, moving to a functional plan of organization, followed by a notional/skill combination, leading to a fully communicative design for the final phases of the course.

In short, the ESP teacher needs to recognize that the various approaches are different ways of looking at the same thing. All communication has a structural level, a functional level and a discorsal level. They are not mutually exclusive, but complementary and each may have its place in the ESP course.



After designing an appropriate syllabus, the ESP teacher embarks upon producing suitable teaching materials which, in turn, will pave the way to undertake teaching tasks and evaluation measures.

### **1.8.3. Materials Production :**

In an ESP situation, appropriate materials are most of the time not available. This view is supported by Hutchinson and Waters (1987) who state : “ *It is likely that a course tailored to the needs of a specific group of learners will not be available.*” (Hutchinson and Waters 1987 : 106) .

Therefore, the production of materials represents an urgent need to be met to better the teaching of the target language. For this reason, materials’ writing is a fact of life for a large number of ESP teachers and is considered as being one of the most characteristic features of ESP in practice. The ESP teacher has to devise materials which present an obviously useful area of the language so that learners can see the direct link between the course content and their needs. Such an idea is strongly emphasized by Meads (1978) who says : “ *The efficiency of ESP materials should be measured by the degree to which the student recognizes the relevance of the content to his immediate needs.*” (Meads 1978 :2) .

Hence, ESP is an approach to language teaching which aims to meet the needs of particular learners. This means, in practice, that much of the work done by ESP teachers is concerned with designing appropriate courses for various learners. Thus, whereas course design plays a relatively minor part in the life of the general English language teacher – since courses, in this case, are usually being determined by tradition, choice of textbook or ministerial decree – for the ESP teacher, materials design is often a substantial part of the workload. Furthermore, the production of such materials is not an easy task to fulfil since the ESP teacher is not a subject specialist. Besides, few teachers; if not any; have had any training in the techniques and skills of materials’ production.

In ESP, materials are created on the basis of the data yielded by the analysis of learners’ needs and the plan of work provided by the syllabus. Needs analysis provides the necessary information about the type of language required during the ESP teaching situation in terms of target needs (related to real-life situations) and learning needs (related to the learning situation). The syllabus, on its part, translates such pieces of information into learning objectives upon which course content will be selected and graded. After that, the ESP teacher proceeds to the production of adequate materials and suitable activities.

The ESP learner needs to acquire the linguistic repertoire and to handle the communicative acts related to the field he is/will be working or studying in. This is why, the use of authentic materials is, generally, viewed as necessary in ESP teaching. In this vein Robinson (1990), claims : “ *A key concept...felt to be particularly relevant for ESP is that of authenticity.*” (Robinson 1980 : 5) .



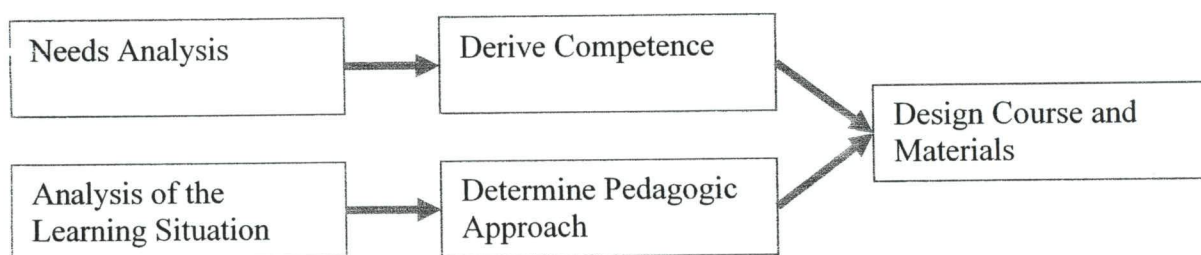
Authenticity is an important criterion in the determination of ESP applicable materials merely because of the orientation towards a definite purpose. It is proposed that the only way in which learners can learn to handle authentic material is by exposure to it. Such an exposure should occur as extensively as possible (Johns 1995).

Speaking about authenticity, Gulliver (2001) goes further by arguing that an ESP course has to have a high degree of what he calls “task authenticity” and “text authenticity”. “ *Task authenticity is the extent to which tasks in the language classroom are comparable to tasks the students need in their content courses or jobs* ” (Gulliver 2001 : 398), whereas, “ *Text authenticity is a measure of the extent to which the language used in the language classroom is comparable to the language students are likely to encounter in ‘the real world’* ” (Ibid). The former author pursues by stating that without a high degree of task and text authenticity, the ESP course runs the risk of losing the advantages of cost-effectiveness, higher motivation, sense of relevance and improved learning, that justify its existence.

The determination of course objectives, students lacks and expectations and the use of authentic language will generate the production of suitable teaching materials. However, when designing ESP courses, teachers may also have recourse to some already published materials, even through Kennedy and Bolitho (1984) consider that “*The more specific the learners’ needs are, the less likely they are to be met by published material.*” (Kennedy and Bolitho 1984 : 22).

Thus, such materials may be considered as inadequate. Yet, they are not useless and can provide practice in one or more areas of language use. This is why, it is up to the ESP teacher to adopt or adapt these materials according to students’ needs.

Throughout their works, Hutchinson and Waters (1987) suggested two interesting and complementary models as bases for the design of ESP materials, the first of which is illustrated in the figure below :



**Figure 1.2 : Approach to Course Design**  
**Source: Hutchinson and Waters 1987**

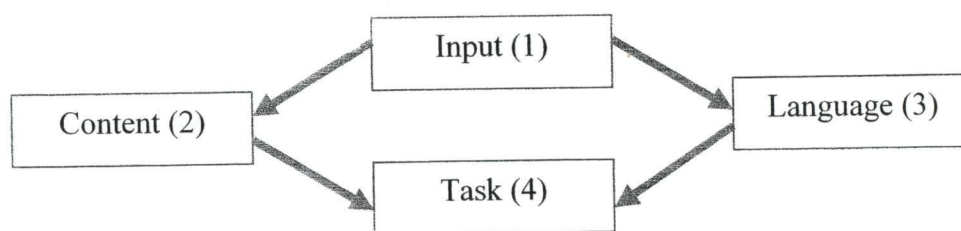
In designing materials, Hutchinson and Waters proceed by, first, analysing learners’ needs in order to derive the required level of competence in the target situation. Through this step, the teacher can also determine learners’ lacks and expectations.

The analysis of the learning situation, then, provides information about the environment of the learning situation and allows the course designer to determine

the process through which the ESP course or materials will be presented, i.e. the pedagogic approach.

The combination of these elements (learners' needs and lacks, the learning environment and the pedagogic approach) will allow the identification and production of the type of content and materials suitable for the ESP course.

When designing their own materials, Hutchinson and Waters (1987) used the model summarized in the following figure with the aim to provide a coherent framework for the integration of the various aspects of learning.



**Figure 1.3 : A material Design Model**  
**Source : Hutchinson and Waters 1987 : 109**

According to the requirements of the target situation, the necessary input will be selected. This input will, therefore, lead the learners to perform a communicative task using the content and language knowledge built up through the unit.

The previous writers also suggest that materials should not be tightly structured as to produce a monotonous pattern of lessons. A material model must be clear and systematic, but flexible enough to allow for creativity and variety.

In any teaching situation be it in general English or in ESP, the teacher's task is to present the content and the different activities of the courses in a variety of ways with the aim to help the students to learn the target language.

#### **1.8.4. Teaching :**

In any teaching situation be it in general English or in ESP, the teacher's task is to present the content and the different activities of the courses in a variety of ways with the aim to help the students to learn the target language.

Stevens (1988) defines the ESP teacher as : *"Almost always he or she is a teacher of General English who has unexpectedly found himself/herself required to teach students with special needs."* (Stevens 1988 : 41). This means that a teacher of ESP is, generally, a teacher of general English who becomes in charge of ESP courses. Such an experience has often been described as being a shock because of the fear of being unable to cater for learners' specific needs.

In addition to his normal functions as a classroom teacher, the ESP teacher has a great variety of often other simultaneous roles as a needs analyst, syllabus designer,



materials' writer, tester and evaluator. This is the reason why people like Swales (1985), Robinson (1991) and Dudley Evans (1998) prefer to use the term "ESP practitioner" rather than "ESP teacher". Such functions stem from the fact that the ESP learners have particular needs and, thus, special learning interests.

Accordingly, Robinson (1991) states that flexibility is a key quality needed by the ESP teacher, in order to change from being a general to a specific language teacher and to be able to cope with different groups of learners.

Furthermore, and in order to meet the same end, the ESP teacher has to be eclectic. Miliani (1994) clarifies this point by stating :

*Intrinsically speaking, eclecticism does not recommend certain principles and reject others. It leaves the door open for any stratagem or technique which could fit in a given situation. It all depends on the teacher's know-how and his approach to language teaching.*

This implies that an eclectic teacher should be a skeptical person but not a prescriber. He should have this know-how or savoir-faire in transmitting the information required and more precisely in presenting the input to the learners. In other words, he has to adopt or adapt different teaching methods, techniques and materials in order to live up learners' expectations and reach the required competence.

### **1.8.5. Assessment :**

Assessment is one of the most important parts of the educational system, in general, and an essential component of the ESP teaching learning process just as needs analysis, syllabus design, materials production and teaching.

The ESP challenge lies in satisfying specific needs. Evaluation helps, then, to assess how well the needs that have created the demand for a given course are being served. It seeks, thus, to measure learners' achievements, to diagnose their difficulties and to evaluate the syllabus as well as teachers' performance. In other words, the results of assessment reflect how and what teachers teach, how and what learners learn and what happens during both the teaching and learning processes . Such outcomes help to improve the teaching techniques and to make the necessary adjustments and pedagogic decisions.

For a better evaluation procedure, Hutchinson and Waters (1987) suggest two interrelated levels of assessment :



**Learner Assessment :**

It aims essentially to measure learners performance and level of proficiency, ie. what they already know. This kind of evaluation is said to fulfil two functions; besides assessing students' performance, it enables to diagnose their linguistic problems and difficulties and provides a positive feedback about the type of input required in the following courses, to cater for learners' needs and lacks.

**Course evaluation :**

It concerns the evaluation of the course itself. That is to say, it checks whether the ESP course has met its aim(s) or not.

These two forms of evaluation are complementary and of a great help for the ESP teacher. They give him an interesting opportunity to test himself and to assess the efficiency of his teaching materials and methods. Hence, one has to develop a positive attitude towards tests' results and to see them less as determiners of grades and more as the starting point for any necessary revisions and improvements.

**1.9. Conclusion :**

This chapter has set out to show the necessary features that characterize the sphere of ESP displaying its history, definitions, branches and the main practices laying behind ESP course design. It also tried to draw a distinction between General English teaching and ESP teaching.

ESP has its basis in an investigation of the purposes of the learners and the set of communicative needs arising from these purposes. Thus, course designers try to plan suitable teaching syllabuses and to produce appropriate materials for the ESP teaching/learning situations. To fulfil this task an important parameter has to be highly considered first. It concerns the identification and analysis of students' needs.

Therefore, the purpose of the next chapter is to investigate into a particular teaching/learning situation of ESP, namely that of first year post-graduate students of Physics, at the University of Tlemcen. The aim of such an analysis is to highlight the major problems faced by the learners under consideration as far as English learning is concerned and try to give some possible solutions by determining and identifying their real needs.

## **Notes to Chapter One**

1. A scientific community : a group of people who study or work in the scientific field and use a specific language to express themselves scientifically.
2. Language usage : the manifestation of people's knowledge of the language system. This includes grammar rules, spelling, punctuation and so on.
3. Language use : the manifestation of people's knowledge of the language system to achieve communicative purposes in communicative settings

# *CHAPTER TWO*



## ***Chapter Two :*** **DATA COLLECTION**

### **2.1. Introduction :**

The widespread use of the English language as an international means of communication is in a continual growth. This fact is reflected in different fields and in a variety of ways notably, its inclusion in the formal educational systems all over the world, and our country is no exception.

In Algeria, the educational authority strives to develop the status of English due to the prominent role it plays as a means of access to international trade as well as scientific and technological exchanges. To meet this end, ESP courses are provided, especially at the tertiary level. Such courses are targeted to meet specific objectives which can be either academic or occupational. Yet, teaching and learning results still remain, unsatisfactory.

The present chapter aims at describing a particular ESP teaching/learning situation, and more precisely an EST one, with the hope to identify the major reasons lying behind such negative outcomes. A set of hypothesis has been put accordingly. Thus, it will be necessary to collect data through selected research methods.

### **2.2. Description of the Teaching/Learning Situation :**

ESP courses are offered in different Departments nationwide to cater for specific needs of the learners, especially to handle communication acts in the target situation, to achieve either academic or professional purposes.

The present research work deals with one aspect of ESP teaching in Algeria and more precisely, that of first year post-graduate students in the Department of Physics, at the level of Tlemcen University.

### **2.2.1. The Educational Institution**

The Department receives students awarded with the “Licence” in Physics and who succeeded in the post graduation entrance exam in this field. The studies last two years for the obtention of a post-graduation degree in one of the various specialisations offered by the Department, in question. Such specialisations fall into six categories which are :

- Plasma and Ionised Gas.
- Electronic Physics.
- Physics of Polymers.
- Condensed Matters.
- Rays.
- Theoretical Physics.

Alongside with their studies, the students receive an ESP training and more precisely an EST one during their first year of post-graduation. The aim of this training is to enable the learners, as such, or as future researchers or subject teachers to read scientific literature, especially the one related to their specialisation, to keep abreast of the latest developments and discoveries in such a field, and be in contact with other peers, at the national and international levels.

#### **(i) The Status of English in the Department of Physics :**

Despite the relevant importance of English in this field, it still holds a low status in the curriculum compared with the other subject-specific modules. Its coefficient is of one only whereas those of the other modules vary from two to seven. Consequently, even if it is compulsory, the English course is regarded as an additional subject by the students. Such a language is very important to fulfil their target needs but less serious as a module than the main subjects included in the curriculum.

#### **(ii) The Teaching Load :**

At the university level, the time allocated to the English course differs according to the fields and levels of study. Therefore, students in different Departments do not share the same time of ESP courses. In the Department under study, the official teaching load is of one hour and a half a week. Frequently, the sessions are reduced to one hour teaching time, only.

Moreover, the English course is programmed to be the last one of the day and falls between 15:30 pm and 17:00 pm. This fact has a great impact on learners’

attendance which is claimed to be irregular, except for examinations. Furthermore, the English module generally starts three to four weeks after the official date fixed for the beginning of all the courses.

The following table illustrates the timing in terms of hours and years of study allocated to the teaching of English in different Departments:

Departments	Time Allocated to the Teaching of English					
	Graduation				Post-Graduation	
	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	1 <sup>st</sup> year	2 <sup>nd</sup> year
Physics	—	—	—	1h.30	1h.30	—
Chemistry	—	—	—	1h.30	1h.30	—
Mathematics	—	—	—	1h.30	1h.30	—
Economics	2h	2h	2h	2h	1h.30	—
Biology	1h.30	1h.30	1h.30	1h.30	2h	2h

**Table 2.1 : Time Allocated to the Teaching of English in Different Departments**

### (iii) Teaching Materials :

Generally speaking, there is a lack of material suitable for teaching. The ESP teacher has no outside help. He is offered no administrative support; such as the syllabus, textbooks or audio-visual aids; except the blackboard and a small classroom gathering thirty to forty students. Consequently, he has to rely on himself to provide the syllabus and materials that would help him.

Moreover, the teacher has, from time to time, recourse to some already prepared materials taken from different sources. In other cases, he is compelled to use his own available materials even if they are supposed to be unsuitable for the type of learners he is teaching.

Appendix A gives an idea about the type of materials used in the class the investigator was concerned with. The material is that of a second term session. It aims at the definition of concepts related to general science, with the study of some related vocabulary. As a final step of the course, students have the choice to translate an excerpt into French or Arabic.



#### **(iv) The Teachers :**

The teacher involved in the ESP teaching situation held a “Licence” in English a few years ago. He is a Secondary School teacher and was appointed to teach ESP, too, in 2004.

The teacher in question has received no special training before being in charge of ESP learners. Such a lack of pre-service constitutes a serious problem since; on the one hand, the teacher is suffering from a serious lack of scientific jargon. On the other hand, and alongside with teaching ESP, he is, also, totally in charge of designing ESP courses. It stems from the fact that no syllabus or teaching materials are provided by the Departments’ administration (See 2.2.iii).

Besides, the teachers’ attitude vis-à-vis the situation is almost negative. He claims that despite his efforts to provide an acceptable knowledge, learning results are unsatisfactory and students’ level of proficiency remains nearly uneven.

#### **2.2.2. The Learners :**

Students have access to the Department after having succeeded in the post-graduation entrance exam. All of them hold for a “Licence” in Physics, and have had English courses during the final year of their studies. Such courses were supposed to be ESP ones but they were, in reality, intended to refresh the learners’ memory after a break of, at least, three years of official English instruction.

Furthermore, the students have studied in different learning environments before entering the university : either in general or technical Secondary Schools. The subject matters learned are different in each of the institutions; therefore, the knowledge of the English language varies from one student to another.

At this level, the students are well aware of the importance of the English language in their field of specialisation and of its usefulness to fulfil their needs. Thus, such learners may be said to be, to a certain extent, motivated.

#### **2.3. Research Methods :**

The main concern of this research work is to identify the problems of English learning in the Department of Physics in order to search for a more adequate framework for teaching such a language, to get rid of the difficulties and inconsistencies encountered by both teachers and learners and, thus, help students learn ESP so as to be able to behave adequately in the target situation.

To meet these ends, the researcher has had recourse to several data collection methods. These instruments have been selected according to the type of information

sought for by the investigator and the sources of data used (the learners, ESP teachers, class observation, and so on).

The main objective of data collection is to provide evidence for the hypotheses set. Target needs, students' necessities, lacks and wants have been put accordingly. These pieces of information will, therefore, enable the investigator to undertake or, at least, suggest any change(s) in view of improving the teaching process and learning outcomes.

### **2.3.1. Description of the Target Situation :**

In the case under investigation, ESP courses are provided simultaneously with the specialisation. This means that the students are confronted to the target uses of the language during their post-graduation, first, before being required to use English after the obtention of their degree to pursue further studies or research or to achieve occupational purposes. Hence, the ESP courses provided to the students under concern are both academically and occupationally-oriented.

For the sake of identifying the requirements of the target situation and the different uses the English language is put to during and after post-graduation, the researcher has interviewed former post-graduate students of Physics who are pursuing their academic and/or professional careers, and tried to attend some international meetings held in this field.

#### **(i) Interview with Former Students :**

In this case, the investigator adopted a type of semi-structured interview since it allowed the interviewer to have

*A general idea of where he or she wants the interview to go... it gives the interviewer a degree of power and control over the course of the interview... this form of interview is a privileged access to other people's lives.*

(Nunan 1991 :149 - 150)

This means that the interview's informal characteristics enable the interviewee to talk freely about the area under study. It can provide deep "*illuminating information that cannot be obtained by any other way*" (Weir and Roberts 1993 : 145).

The preparation of such an interview involved the following steps, synthesising Nunan's (1991) and Weir and Roberts' (1992) :

- The determination of objectives, i.e. the type of data one would like to collect.
- The determination of the type of questions that lead to the determined objectives, i.e. a careful division of questions, accompanied with decisions of where to allow



freedom of speech and where the interviewer will have to intervene and to add questions.

- The division of the set of questions according to the interviewees.

The researcher was also aware of what the interview requires in terms of : explanations of the nature of research, the purpose of the interview, the way data are to be used and mainly questioning in such a way to encourage the respondent to relate his experiences and opinions (Nunan, 1991).

As previously mentioned, the primary objective of the interview held with former post-graduate students of Physics, was to identify the different requirements of the target situation as far as the English language was concerned. Therefore, the questions of the interview revolved around the following preoccupations :

- The different uses of the English language during post-graduate studies.
- The various academic or occupational opportunities offered to the students after their post-graduation.
- The role played by the English language to meet the academic or professional requirements.
- The different occasions in which the English language is used to perform either academic or occupational needs.
- The main problems encountered as far as the target uses of the language are concerned.
- The different strategies used to cater for the interviewees' inappropriate command of the English language in order to meet the requirements of the target situation.

### **(ii) Authentic Uses of the Target Language :**

Besides interviewing former post-graduates about the various target uses of the English language, the researcher wanted to " investigate the natural contexts in which it occurs " (Nunan 1992 :53). To meet this end, the investigator has visited several institutions and lived some situations where the language was put to use.

During such an investigation, the researcher has been shown several authentic examples of the target language use such as already presented and/or published research reports, research articles, conference papers and thesis proposals.

The investigator has also lived genuine situations of English use by attending two international seminars held at the national level. Many Algerian and foreign post-graduate students, subject specialists and researchers in Physics took part in these meetings to present their latest findings and innovations, exchange opinions and ideas, and update knowledge. It goes without mentioning, of course, that the only means of communication used in these occasions was the English language. This investigation



was essentially exploratory and aimed at determining what was happening and how English was used in real-life situations. The data was collected through note taking and audio-recordings, when possible.

The information gathered through the description of the target situation was studied and analysed to determine the areas and settings of language use, the social roles performed by the target language and the use of the four skills. The different results will be presented and analysed in the next chapter.

### **2.3.2. Class Observation :**

In addition to determining the target uses the language was put to, the researcher needed to seek information about what was actually happening in the teaching/learning situation itself. To achieve this aim, the investigator has had recourse to class observation since it is regarded as “... *the only way to get direct information on the classroom behaviour of teachers and learners.*” (Weir and Roberts 1993 : 136). Hence, through observation, the researcher can collect reliable data.

The purpose of the enquiry was to determine the gap existing between the knowledge provided to the students and the one required in the target situation, through assessing :

- The teaching materials used.
- The way the course is conducted.
- Learners’ actual language proficiency.

Being observed may be considered as a stressful experience and could be unwelcomed by the teachers. For this reason, the investigator made it clear, before the start of this operation, that it was used as a means of gathering information only and did not aim, at all, at inspecting or evaluating the teacher or his teaching.

To the investigator’s surprise, the teacher did not show any worry about this point and invited the researcher to attend as many sessions as needed to carry out her observation task. Classroom observation has then started since the first session of the year. The class has been observed during twelve sessions, that is to say one hour and a half a week (although the majority of courses lasted, in reality, nearly one hour only) during twelve weeks.

The number of students in the group was thirty-eight but only twenty-two were under observation since they were those who were always present during the twelve-week experiment. To collect the necessary data, the researcher has had recourse to note-taking, referred to as real-time observation (Wallace 1998) and audio-recordings. The latter means was used to record learners’ linguistic behaviour.

The information gathered through class observation revealed important drawbacks and allowed the investigator to confirm the assumptions about the teaching/learning situation under study.

### 2.3.3. Students' Questionnaire :

Since the learners are the centre of the concept of ESP, they were considered, in this research, as an integral part of data collection. Therefore, to confirm the data collected during class observation, one questionnaire was distributed to the learners as a second source of information.

The use of the questionnaire enables the investigator to get objective information about the teaching/learning situation of the English course. Furthermore, Richterich and Chancerel (1980) states that : ***“Questionnaires are structured instruments for the collection of data which translate research hypotheses into questions.”*** (Richterich and Chancerel 1980 : 59)

This means that the questionnaire helps the investigator to check the validity of his/her research hypotheses through written questions addressed to the persons involved in the situation under study. These are referred to as informants and can be the students, the ESP teachers, the subject-specialists, and so on.

It is worth mentioning, at this level, that a preliminary questionnaire was, first, tried out on eight students before hand. The aim of this pilot survey was to have a basis for the production of the final questionnaire.

In the piloting stage, the investigator wanted to check if :

- The instructions were clear and easy to follow.
- The questions were clear.
- The students were able to answer all the questions.
- Any of the questions was :
  - o Embarrassing
  - o Irrelevant
  - o Patronizing
  - o Irritating
- The time that was needed to fill in the questionnaire.

The informants were also invited to give any other comments and suggestions that might help to make the questionnaire more effective.



The results revealed that, because of ambiguous wording, some questions required further clarifications, others needed the omission or addition of some words and others were judged as being useless. Therefore, to avoid misunderstandings, deficiencies and repetitions, the questionnaire was reviewed.

The primary objective of the final questionnaire, distributed to all of the thirty-eight first year post-graduate students from the different specialities of Physics, was to collect data about :

- Students' attitudes towards the English language.
- Students' knowledge of the language (their linguistic background).
- Students' opinions about the content provided to them.
- Students' difficulties as far as the English language is concerned.
- The type of content they would like to learn.

In sum, the questionnaire aimed at highlighting certain problem areas from the students' view points. It was written in English and French in case the students could not understand English (See the questionnaire in Appendix B). Furthermore, it respected the concerns of confidentiality so that the informants might be more honest and information in their responses (Wallace, 1998).

The questionnaire comprised 21 questions of four different types :

- Open questions.
- Closed questions.
- Mixed questions.
- Graded questions.

The first category of questions enables the respondent to express himself/herself freely

*Example :* What do you suggest about the number of years of English Instruction?

Such type of questions : **"... do not call in advance for ready made answers and therefore allow the person questioned more freedom of expression."** (Richterich and Chancerel 1980 : 59).

The second type of questions consists of a selection from many possibilities proposed. In this case, the informant is, then, compelled to give one answer from those displayed and is not allowed to suggest anything else.

*Example :* How long have you stopped practising English after the Secondary School?

- 1 year            ( )
- 2 years           ( )
- 3 years           ( )
- 4 years           ( )
- 5 years           ( )
- More, please specify ...

The third set of questions is a combination of both closed and open questions

*Example :* The time allocated to the English course per week is :

- Sufficient        ( )
- Insufficient     ( )
- If insufficient, how many hours a week do you suggest ?  
..... hours

As far as the last type of questions is concerned, it allows the informant to classify the answers offered and, thus, make his/her attitudes clearer.

*Example :* Would you like to classify these skills according to their importance to fulfil your target needs?

- Listening        1 -
- Writing        2 -
- Reading        3 -
- Speaking       4 -



The four examples of questions given are drawn from the students' questionnaire included or used in this research. The questions were sequenced as follows :

- Questions 1 to 2* : sought information about the learners as individuals;
- Questions 3 to 6* : aimed at collecting information about students' language background and level of competence;
- Question 7* : was asked to provide information about student' attendance to the English course;
- Questions 8 to 10* : aimed at assessing the different uses of English in the target situation and to evaluate, therefore, the importance of this language and students' motivation to learn it;
- Questions 11 to 14* : were asked to provide information about the different problems and difficulties encountered by the learners, as well as their attitudes towards the English course;
- Questions 15 to 16* : aimed at grading the four skills in terms of importance and difficulty;
- Questions 17 to 18* : invited the learners to suggest the appropriate amount of teaching hours and years as far as their field is concerned;
- Question 19* : asked the students if they had recourse to out of classroom services to cater for their lacks in the English language;
- Question 20* : sought students' opinions about the language teacher and subject teacher collaboration;
- Question 21* : invited the learners to make further remarks and suggestions about the present teaching/learning situation.

(See the questionnaire in Appendix B)

The objective sought for through the administration of the questionnaire was to try to identify the students' purpose when studying English and what they expect to do with this language in their present and future academic and/or professional careers. The information revealed not only the learners' viewpoints on classes, teachers and the learning process, but also on their own level of competence and language proficiency.

### **2.3.4. Language Teachers' Interview :**

For the sake of triangulation of data sources, the investigator has had recourse to the teachers' interview as a third source of data collection (Allright 1989)

The investigator intended, at the beginning of her research, to administer a questionnaire, too, to ESP teachers. However, due to the limited number of such teachers in the Department of Physics, the researcher has resorted to using the interview guided by the questions prepared for the questionnaire. Teachers' interview may, then, be said to be a structured interview.

Since there was only one ESP teacher involved in the situation under study, the investigator was compelled to have recourse to three language teachers who have previously been working in the same Department for periods varying from one to four years.

The interviews have been conducted with those language specialists out of a desire to have further precision about learners' background and, therefore, provide information about their profile of needs. They also sought information about the state of the art of English language teaching in those Departments, in general, in terms of syllabus, teaching materials and course content.

The primary objectives of the data collected through the interviews were to have an idea about:

- Teachers' background and qualifications
- Students' knowledge of the language, attitudes and motivation
- The available teaching aids
- Course content and conduct
- Students perceived needs and difficulties

Teachers' opinions and suggestions to improve the teaching situation

On the whole, the interview included twenty-three questions which are classified as follows :

*Questions 1 to 5* : sought general information about the teachers, their qualifications and teaching experience;

*Questions 6 to 7* : asked about the organization of the English course;

- Questions 8 to 10* : aimed at assessing students' level of competence and their attitudes and motivation towards the English course;
- Questions 11 to 12* : intended to know whether there were any syllabus or teaching materials provided by the Department;
- Questions 13 to 18* : sought information about course content and conduct;
- Question 19* : sought information about the main linguistic and non-linguistic problems faced by the teachers when undertaking their task;
- Questions 20 to 22* : aimed to know the teachers opinions about, first, the number of hours and years of English instruction needed as far as this field is concerned; and next, about the collaboration between the language teacher and the subject specialist;
- Question 23* : invited the informants to put forward some remarks and suggestions to solve out the existing problems.

(See the interview in Appendix C)

## **2.4. Conclusion :**

After stating the hypotheses of the present research work, it was necessary for the investigator to select suitable research methods and appropriate procedures. The choice of instruments was based on the type of data sought for by the researcher and the sources of information relied on.

The major aim of data collection was to identify students' needs in terms of target needs, lacks, wants and learning needs. To meet this end, the investigator had recourse to class observation, students' questionnaire and, ESP teachers and former post-graduates interviews. The use of different methods was made to obtain information from different bodies in the same line of study, for the sake of triangulation of data sources.

In the following chapter, the data collected will be discussed and analysed. The investigator will, therefore, try to identify the different reasons of the failure of the ESP teaching/learning situation under study.



## **Notes to Chapter Two**

The Scientific Meetings Attended to by the Investigator :

1. The First International Seminary on Lasers and Applications  
November 14-16, 2005  
Mentouri University, Constantine.
2. The International Congress in Materials Science and Engineering  
February 08-10, 2006  
Aboubakr Belkaid University, Tlemcen.

# *CHAPTER THREE*

## **Chapter Three :** **APPRAISAL OF ESP IN THE DEPARTMENT OF PHYSICS**

### **3.1. Introduction :**

The major concern of this chapter is to identify the needs of first year post-graduate students of Physics, at the level of the University of Tlemcen. Nevertheless, such needs are, probably, shared by other ESP, and more precisely EST, students in other universities nationwide. Two essential types of needs will be sorted out namely target needs and learning needs (See 1.8 – iii). The former reflect the areas of English language use to achieve students specific purposes whereas the latter identify learners' lacks, wants and the requirements of the target situation. To meet these ends, the investigator will undertake a thorough analysis of the different data collected through the various research methods used in the previous chapter.

### **3.2. Requirements of the Target Situation :**

In order to have a clearer picture of students' target needs, an interview was held with former post-graduates in Physics, who are nowadays pursuing either academic or occupational carriers. For the same purpose, some international scientific meetings, held in Algeria, were attended to, as well.

The areas and settings of English use and the language skills required for such a use were determined accordingly.

#### **3.2.1. Areas of Language Use :**

The students may be confronted to different uses of the target language during as well as after their post-graduation. These uses are either academically or occupationally-oriented depending on the types of situations the learners are involved in :

- As a post-graduate, the student is specialising in a particular field and is compelled to undertake a research to obtain his degree
- After the obtention of his degree, the post-graduate may be engaged as a university subject-specialist teacher or as a researcher in a scientific or subject-specific laboratory where he works collaboratively with a great number of foreign scientists. Other students may decide to pursue further studies as doctoral candidates. Those who opt for such an orientation need to conduct a research, too, in order to obtain their research degree. Moreover, and under the framework of cultural exchange, the Department used to have a convention with foreign universities to send some doctoral students, researchers and subject teachers, for a period varying



from three to twelve months. Out of a desire to specialise in a sub-field of Physics which is not provided in Algeria and relying on their own financial means, other students decide to go abroad to pursue further studies and/or research, after their post-graduation.

In our very specific context, English is used to achieve the target needs both during and after the post-graduate studies. Such needs may be academic or professional, but whichever the situation is the English language is highly required, mainly for :

**(i) Getting information :**

As a post-graduate, subject teacher or researcher, one needs to read, understand and extract scientific information, especially the one related to his field and specialisation. To meet this end, one is required to use a variety of references and sources that are available only in English such as scientific books, reports, international articles, magazines, meetings as well as the Internet.

**(ii) Undertaking a research :**

Getting appropriately informed is a pre-requisite to undertake or pursue one's scientific research, be it personal or in collaboration with other scientists. Besides, one needs to remind that conducting a research is a sine qua non for obtaining a research degree.

**(iii) Reporting and publishing :**

Reporting the research activity is one of the most important parts of the research process. In this sense, Guilliver (2001) advocates that even the best scientific research is useless until it is communicated to others. Moreover, as a scientist; i.e. post graduate student, subject teacher or researcher in the field of Physics; one is also required to publish those research reports as well as scientific articles, comments and summaries in international journals and magazines or via the Internet.

Getting one's work published in one of these sources is, and remains, often a daunting task. However, it is essential to ensure that one's work is available to one's colleagues internationally.

**(iv) Taking part in scientific meetings :**

Several international scientific meetings are held in the field of Physics, in different parts nationwide. Numerous Algerian and foreign post-graduates, subject teachers and researchers in this field take part in such occasions to present their research, report their findings, exchange pinions and update knowledge. Other international meetings, of this kind, are held abroad where Algerian attendance and

participation is also very significant. Needless to mention that the only means of communication used in those and all of the other international seminars is the English language.

All these uses of the target language listed above represent the most and foremost way to join the scientific discourse community. Moreover, they are very important from both the scientific and disciplinary perspective and for individuals within a discipline. From the disciplinary perspective, they represent the primary means to get informed, keep up with the latest developments in one's field, and exchange ideas, novel findings and knowledge. If scientists do not communicate, progress in developing new reliable knowledge would be very slow. For individuals, they are the primary means of building one's own scientific personality, establishing a research personality a building a career.

Furthermore, it is worth mentioning that the more one contributes to scientific meetings and publishes scientific articles; during his post-graduate studies or professional or research careers; the more he will be privileged when posts or promotions are being offered.

The different situations mentioned above will involve the language user in different environments and circumstances of language use.

### **3.2.2. Settings of Language Use :**

After determining the various uses the English language is put to in the target situation, a set of settings of language use has been selected according to three essential criteria, namely : the physical factor, the linguistic factor and the human factor.

#### **(i)The Physical Factor :**

The target language may be used in different physical environments to fulfil either academic or professional purposes. In the case under concern, these settings are, in both cases, nearly the same and involve the following :

- The classroom, i.e. during the teaching or learning process.
- The library, i.e. where the physicist finds the needed literature for his studies, research or teaching. This activity can also occur at home, in a personal home study or work.
- The research laboratory, at this level, the student or researcher carries out theoretically and practically and performs experiments in order to test new ideas and



find out new knowledge. In a laboratory, one is likely to work alone or collaboratively with other Algerian or foreign fellows, on a given research project.

- The cyberspace, where it is possible to search for the information needed, publish findings, reports and articles, and communicate with other subject specialists through the Internet.
- The conference room, the English language is also put to use during international meetings for various purposes. It may be used to present scientific achievements, results and findings; to argue and take part in debates; and to interact and exchange ideas with visiting experts, lecturers and researchers.

It is worth mentioning that the Algerian physicist can find himself in the aforementioned settings either in his country or abroad where he may spend a short or relatively long period depending on his target objective(s).

#### **(ii) Linguistic Factor :**

English may be used in three distinct situations :

- In Algeria, for example, during international conferences in order to interact with visiting scientists
- In a foreign country where English is the native language, after his post-graduation, a student may go to an English speaking country such as Canada, the USA or England to pursue further studies and/or research
- In a foreign country where English is not the native language (second or foreign language), where Algerian subject-specialists may be invited to attend and take part in international scientific seminars, such as Switzerland or Italy.

#### **(iii) The Human Factor :**

The target language is used when the individual is either :

- Alone, when reading scientific books, theses, magazines, reports, and so on; or producing a personal work in English like a research report or a scientific article
- With other members of the scientific community as in a research laboratory or during a meeting, to fulfil specific purposes



### **3.2.3. Language Skills :**

The target situation requires the use of the English language in different areas to meet several ends. Such a use involves the four language skills :

- Listening : The English user needs to listen and understand the target language to fulfil academic or professional purposes; for instance, when working with foreign researchers.
- Speaking : The English language is needed to interact and converse with foreign scientists and visiting experts, to take part in seminars and give oral presentations.
- Reading : The physicist needs to read and understand the scientific literature available, especially the one related to his field specialisation. The references available involve scientific books, magazines, articles, reports, summaries, and so on. These sources of information are also available on the Internet.
- Writing : The practice of this skill includes taking notes, writing and/or publishing research articles, scientific comments, summaries, reports of personal experiments, conference papers, and so on.

After having dealt with the different uses of the target language required either during academic or professional careers, the various areas and settings of language use, as well as the language skills needed to perform such purposes, the investigator moves, therefore, to analyse the data collected about the teaching/learning situation under concern. The aim of this analysis is to make it possible to determine the gap existing between students' actual level of competence and the one required in the target situation.

### **3.3. Data Analysis :**

In order to gain a through and overall understanding of what was actually happening in the teaching/learning situation under consideration, and be able to detect the different elements affecting such a situation either positively or negatively, the researcher had recourse to several sessions of classroom observation, students' questionnaires and language teachers' interviews.

#### **3.3.1 Classroom Observation :**

Class observation enabled the collection of interesting and reliable data about the concerned teaching/learning situation. Such information revealed important drawbacks about the teaching process and learners' knowledge of the language and linguistic behaviour.

The class has been observed during twelve sessions since the beginning of the academic year. The target group comprised thirty-eight students but only the twenty learners who have always been present during the twelve-week experiment were under observation. These were nine male and eleven female students.

The information collected through classroom observation can be summarized in what follows:

Although ESP sessions had to be weekly held, this was not often the case. It depended, in fact, on the teacher's presence. Being a Secondary School and part-time teacher, the ESP teacher had, from time to time, other commitments which prevented him from providing the ESP course.

In some cases, the post-graduate students were given their ESP course with fourth year graduate students of Physics or with fourth year Hydraulic students. In other instances, the English course was given with both groups, simultaneously. In such instances, the number of the students brought together exceeded sixty-five. Consequently, they were compelled to search for a vacant lecture hall to be given their ESP course.

The frequent absenteeism of the ESP teacher, the irregular conditions in which English courses were provided, in addition to their status in the curriculum and students' time table, had a great impact on learners' attendance and attitudes towards the ESP course. Hence, much of them decided to, totally, quit such courses and to sit for the evaluation exam, only. Class observation also enabled the collection of the following information about :

#### **(i) Course Content and Conduct :**

Throughout the twelve sessions of class observation, the first thing noticed by the researcher was that the learners were presented with nearly the same type of content within each unit. In other words, all the courses provided were built up in the same way. Furthermore, no unit was dealt with in more than one session.

At the beginning of each session, the teacher distributed handouts containing course content to the students. The amount of such papers was almost always insufficient. The learners were, therefore, asked to sit in pairs or more during the ESP course and to make photocopies of the distributed papers, afterwards.

Within each unit, a given theme was introduced in the form of a text. Such themes were sometimes related to physical sciences and other times to science, in general. Thus, it is clear that the choice of topics is neither selective nor gradual. It is done at random since the teacher himself reported that whenever he finds a scientific text, he brings it to the classroom.

At first, the teacher reads the text under study, once, and explains it orally, at the same time, using French or Arabic but never English. Furthermore, he puts emphasis on



the clarification and translation of the scientific jargon present in the text, using again French and/or Arabic.

After that, the students are asked to answer some reading comprehension questions through several exercises. As a final step of the course, the learners are given the choice to translate a passage from the text studied into Arabic or French. From time to time, they are asked to learn such a translation by heart.

It is worth mentioning that the students are not offered enough time and opportunities to read and understand the text studied. Therefore, there is no development of learners' reading strategies.

Moreover, in addition to the wide use of French and sometimes Arabic by the students whenever they want to communicate during the English course, all reading comprehension questions require ready-made answers from the text. Thus, no opportunity is given to the learners to use their own words and expressions to respond. Furthermore, in most cases, the answers are provided by the teacher himself who spends most of the time speaking meanwhile students keep listening and taking notes, remaining almost tongue-tied. Hence, there is no practice of word pronunciation on the part of the learners and no error correction from the teacher. Such a lack of practice tends to inhibit seriously the development of students' ability to communicate in the target language.

The investigator also noticed that except translating some passages into Arabic or French, there was no language output. In other words, the students did not present any personal production whether written or spoken. In addition to that, they were not trained in any form of writing (defining, describing, classifying, reporting, ..., etc). One has to keep in mind that such learners are post-graduate students who have to read scientific literature, attend and even take part in international scientific meetings and seminars, write theses and publish articles where the English language is highly required and used. Therefore, the mastery of its four skills is of primary importance.

The researcher also discovered that the majority of the texts treated and activities performed by the students, at this level, have already been dealt with during their fourth year English programme.

It is important to recall that class observation started since the first ESP session of the year to follow the progression of the content provided to the students. However, as the courses proceeded, the investigator witnessed a kind of routine since all the units were built up on the same pattern. In addition to that, the content of courses was somehow limited, neither gradual nor challenging. It did not aim at improving students' level and embarked them upon a series of mechanical habits with no consideration of their actual lacks and needs. This was the case during the whole sessions attended to by the investigator. Such a fact had a negative effect on learners' attendance and attitudes towards the ESP course since nearly half than started to absent themselves from this course starting from the fourth session of the year.



## (ii) Students' Linguistic Problems :

Classroom observation enabled the investigator to record some instances of students' linguistic behaviour. The learners are, on the whole, poor manipulators of the English language both in its written and spoken forms. The relatively few utterances produced by the learners revealed important shortcomings in the following areas :

### Phonology :

The majority of the students tend to mispronounce some English speech sounds. However, such a problem occurs more frequently with vowels than consonants, especially English diphthongs which are often shifted into Arabic or French vowels. The same difficulty is noticed with stress and intonation. Examples of some mispronunciations are given in the following table :

<i>Areas of difficulty</i>	<i>Examples of words expressions</i>	<i>The wrong pronunciation</i>	<i>The right pronunciation</i>
Consonants	Gas	/gæz/	/gæs/
Vowels	Ionisation	/ionizæʃn/	/aɪənaɪzeɪʃn/
Stress	Temperature	Temperàture	'temperature
Intonation	Steam may be liquified	Steam may—be—liquified	Steam— may be liquified

**Table 3.1 : Students' Phonological Problems**

### Vocabulary :

Students' vocabulary is very limited, be it in general science or in Physics. Although they have, sometimes, too much to say or write, they do not have enough vocabulary to do so. Therefore, they make too much use of French and/or Arabic words or full sentences, as a final resort, to express themselves and make themselves understood. Moreover, nearly all the English words used are mispronounced.

### Grammar :

The students encounter serious grammatical difficulties displayed in the misuse, for instance, of auxiliaries, pronouns, articles, adjectives and adverbs, tenses, and so on.

As an illustration, one may cite the following example in which a student failed to give the correct form of the verb "to be", in the present, with the plural :

*Example :*

The learner said : \**“There is several sources of energy”*

Instead of : *“ There are several sources of energy”*

### 3.3.2 Students' Questionnaires

In order to elicit more information necessary to the present situation analysis, a questionnaire survey was distributed to first year post-graduate students. Contrary to class observation which was centred only on the twenty students who attended regularly the English course, the questionnaire was addressed to all of the thirty-eight learners making up the group under study.

The data obtained from the questionnaire is the following :

*Question 1 : Students' sex*

<i>Sex</i>	<i>Absolute Frequency</i>	<i>Relative Frequency</i>
Male	22	57,89%
Female	16	42,10%
Total Number	38	100%

**Table 3.2 : Students' Sex Partition**

The group is made up of twenty-two male and sixteen female students. The percentage of males is slightly higher compared with that of females.

*Question 2 : Students' age*

The students are aged between twenty-two and twenty-seven years old.

*Question 3 : Number of years of English study*

The answers are shown in the following table :

<i>Number of years</i>	6 years	7 years	8 years
<i>Number of students</i>	29	5	4

**Table 3.3 : Number of Years of English Study**

As can be seen from the table above, the number of years of English instruction varies from six to eight years. However, all of the students have studied English for at least six years, those who have repeated one year or more at the middle or secondary levels; especially those who have failed in the Baccalaureate Exam; have studied English for a longer period.

*Question 4 : Number of years without the practice of English after the Secondary School*

<i>Number of years</i>	1 year	2 years	3 years	4 years	5 years
<i>Number of students</i>	/	/	34	3	1

**Table 3.4 : Number of Years without the Practice of English after the Secondary School**

The majority of the section gave the same answer that is three years, with the exception of four students, three of which stopped practising English during four years and one during five years.

*Question 5 : Intended to know if the students had had any English courses at the university, at which level, and of which nature*

All the students replied that they had, indeed, English courses at the university level during the final year of their graduation, i.e. the fourth year. Such courses, through intended to be ESP ones, concentrated mainly on refreshing the learners' memory after a break of three to five years of English instruction. These were, therefore, rather general English courses.

*Question 6 : Students' self-assessment*

This question asked the learners to evaluate themselves, the answers are shown in the following table :

<i>Level</i> / <i>Sex</i>	<i>Beginner</i>	<i>Intermediate</i>	<i>Advanced</i>
Male	16	6	/
Female	12	4	/

**Table 3.5 : Students' Self-Assessment**



According to the table above, none of the students admit that they are at an advanced level in English. The majority of the students consider themselves as beginners whereas a few number of them view themselves as intermediate.

*Question 7 : Class size*

The answers varied from one student to another. Some estimated that the number of the students attending the ESP course was between ten and twenty, others replied that it was between twenty and thirty whereas other students said that the group consisted of more than forty-five students. This variation in group size is mainly due to students irregular attendance to the ESP course and the variable conditions in which such a course is held, i.e. those students are sometimes given the ESP course alone whereas other times, they share this course with students from other levels and other sections (See 3.3.1.).

*Question 8 : Reasons for learning English at the post-graduate level*

The objectives for learning English at this level are manifold. The answers obtained are summarized in what follows :

- English is the international language of science
- For reference purposes : reading scientific books, international journals, articles, theses, use the Internet, and so on
- To undertake a scientific research
- To write and/or publish scientific reports, international articles, seminar papers,... etc
- To attend and take part in international scientific meetings
- To interact and be in contact with foreign experts, researchers and lecturers in the field of Physics
- To work in a research laboratory, in Algeria or abroad
- English is highly needed by the subject teacher
- To go abroad to pursue further studies and/or research

*Question 9 : Students' opinions about the importance of the English language in their specific field*

All the students replied that English is very important for their career in Physics

*Question 10 : Students' motivation to learn English*

All the students are motivated to learn English because they are highly aware of the necessity to be able to function in this language in order to fulfil their target needs.

*Question 11 : The appropriacy of the of the ESP course to students' target needs*

The respondents replied with no exception that the courses provided by their ESP teacher did not meet their target needs.

*Question 12 : Students' appreciation of their ESP courses*

The majority of the students replied that they did not appreciate at all their English courses. They claimed that the content provided was uninteresting both in terms of themes and activities. Moreover, the fact that all the courses were built up on the same pattern made them monotonous and boring. Some learners added that an English course programmed in the afternoon from 15.30 pm to 17.00 pm, after a series of subject-specific courses and achievements would never be appreciated whatever the content.

*Question 13 : Difficulties encountered in English*

Nearly all the students have pointed out to the same types of difficulties. These are, in general, related to :

- Grammar
- Vocabulary
- Pronunciation
- Sentence construction

These answers converge towards the results drawn by the investigator from class observation (See 3.3.1.).

*Question 14 : The causes of the problems encountered in English*

Each of the students listed three or four of the following facts as being responsible for the problems they encounter in English :

- Students' poor level in English
- The insufficient time allocated to the English course
- The inexperience of the ESP teacher
- The lack of an appropriate syllabus to guide the teacher
- The inadequacy of the materials provided, i.e. the content of courses
- The non-exposure to and practice of the target uses of the language

*Question 15 : Importance of skills*

The students were required to grade the four skills in terms of importance. Their answers gave the following ratios :

Number of the students

<i>Number of the students</i> <i>The skills</i>	<i>Absolute Frequency</i>	<i>Relative Frequency</i>
Listening	8	21,05 %
Writing	10	26,31 %
Reading	11	28,94 %
Speaking	9	23,68 %
Total	38	100 %

**Table 3.6 : Importance of the Four Skills**

At first glance, it appears from the table above that the four language skills have nearly the same degree of importance to fulfil students target needs. Nevertheless, reading comes first since it was attributed the highest ratio. Writing comes in the second position. As for the speaking skill, it is placed in the third position slightly above listening which was given the lowest ratio. The table reveals, therefore, that language receptive skills are as important as the productive ones to meet learners' needs.

*Question 16 : Classification of skills in terms of difficulty*

<i>Number of the students</i> <i>The skills</i>	<i>Absolute Frequency</i>	<i>Relative Frequency</i>
Listening	8	21,05 %
Writing	11	28,94 %
Reading	7	18,42 %
Speaking	12	31,57 %
Total	38	100 %

**Table 3.7 : Classification of the Four Skills in Terms of Difficulty**



As far as this question is concerned, the majority of the learners have difficulties with the productive skills of the language, i.e. speaking and writing, since these were given the highest ratios. Nevertheless, a considerable number of the learners have problems with the receptive skills, i.e. listening and reading, as well. Once again, students' answers confirm what has been noted by the investigator during class observation since the learners were unable to utter or produce a simple correct sentence (See 3.3.1.).

In view of their importance in the target situation, appropriate training in language skills represents an urgent need to cater for learners' difficulties. Such a practice should be integrated in the design and production of teaching materials.

*Question 17 : Students' views on the weekly teaching time*

All the students, with no exception, replied that one session of one hour and a half a week – frequently reduced to one hour only – is far enough from being sufficient to improve their English level and satisfy their needs. Moreover, when asked to suggest a weekly teaching time, the majority of the students answered at least four hours.

*Question 18 : Students suggestions concerning the number of years of English course*

The whole section recommended that English courses should be provided since the first year of tertiary studies. This reflects the fact that they are aware of the insufficiency of the number of years of English instruction, on the one hand, and of the vital need of English learning in parallel with the main subjects to fulfil their target requirements, on the other hand. Therefore, English learning should be a continuous process. In other words, a non-stop exposure is highly desirable and strongly recommended.

*Question 19 : Recourse to out-of-classroom services to fulfil target needs*

In view of the various lacks encountered by the learners, such as their poor knowledge of the language and the insufficient time allotment, the students were asked if they had recourse to any alternatives in order to fulfil their target needs. All of them reported that as soon as they undertook their post-graduate studies, they felt the need to:

- Seek for help from English language teachers or students even if it was sometimes difficult to get in touch with them because of time constraints
- Subscribe in private institutions which provide English courses even if, in the majority of cases, such courses are in general English
- Furthermore some students replied that many of their articles or research reports remained unpublished because of their imperfect command of the language.

*Question 20 : Students' opinions about the language and subject teachers' collaboration*

The majority of the students answered positively. Hence one may advocate that there has to be a close link between the specialist and language teacher. This collaboration would be beneficial to train the latter in the specific field of study and render his ESP teaching effort more efficient.

*Question 21 : Students' opinions and suggestions*

The students were invited to give their personal view points and to offer any suggestions in order to improve and better the prevailing teaching/learning conditions. Some interesting ideas were put forward, which can be worded as follows :

The learners expressed their regrets regarding their poor level in English and difficulties encountered in this module. This makes them have a low opinion of their chances in learning English and in succeeding to put it to use in the target situation

The students complained about the fact that they had Arabic courses during the first three years of their graduation. They argued that such courses were of no use and should be replaced by English courses since an early exposure to the English language, at the tertiary level, would enable them to be better prepared and readier to undertake post-graduate studies. In sum, the students suggested a continuous exposure to the English language from their first year of graduation to their second year of post-graduation

The informants felt that what mattered most for the teacher was the quantitative and not the qualitative aspect of the language taught. They complained about the fact that the teacher moved from one point to another without trying to find out if his learners had mastered or not all what has been taught

The students in question expressed their disappointment vis-à-vis the irrelevancy and inappropriacy of the courses provided as well as the routine witnessed as the courses proceeded

The teacher has to take into account students' linguistic level before giving his course

Designing a syllabus that is relevant to learners' level and field of study, in terms of themes and language practice

Introduce the content chosen gradually and according to students' level of competence. In other words, the students have to come, gradually, to contact with English that exists in the target situation. To meet this end, the teacher may create real language use situations such as oral presentations and role-plays

The students complained about the method used by their ESP teacher arguing that reading a text, answering some reading comprehension questions then translating an excerpt into Arabic or French is, sometimes, a very easy matter but a very bad



method'. They added that being able to do some exercises with success, in the class, does not mean that they have a good level in English

The learners also replied that if their ESP teacher found difficulties in materials production, they were ready to help him devise interesting courses. In other words, the learners proposed to make their teacher better aware of their target needs, in terms of themes and tasks. Some of them went further by suggesting that the students bring authentic pieces of language use; i.e. the ones they are confronted to in the target situation such as scientific articles, research reports or seminar papers; to study

### 3.3.3. Teachers Interviews :

The data obtained from the teachers' interviews was identified and analysed according to the rubrics mentioned in 2.4.4.

#### *Question 1 and 2 : Teachers' sex and qualifications*

The four teachers interviewed were men, three of whom had a "Licence" in English language and literature whereas the fourth one had a Magister in the same field. These teachers happened to be part-time teachers, in the Department of Physics, and were paid hourly since they had other commitments either at the secondary or tertiary levels. Such a fact had a considerable affect on the quality of their ESP teaching, i.e. attendance, materials production, and so on.

#### *Question 3 : English Language Teaching (ELT) experience*

<i>Teachers</i>	<i>Level of Experience</i>	<i>Years of Experience</i>
1	Tertiary	2
2	Secondary	4
3	Secondary	7
4	Secondary	1st year

**Table 3.8 :Teachers'ELT Experience**

The amount of ELT experience varies from 0 to 7 years at the secondary and tertiary levels. The teacher involved in the ESP situation under study had been teaching ELT for 4 years at the Secondary School before being appointed to teach ESP, too. Two of the other teachers who have been previously teaching ESP in the same Department have, respectively, taught ELT for 2 years at the tertiary level and 7 years at the secondary level, whereas the third teacher had had no previous experience. It was his first year of ELT at the Secondary School.



*Question 4 and 5 : ESP teaching experience and training*

As far as ESP teaching experience is concerned, the results ranged from 1 to 3 years. For the teacher in charge of the ESP teaching situation under study, it was his first year of ESP teaching whereas for the three other informants, the answers varied from 2 to 3 years. The question concerning ESP training revealed that none of the teachers had had a special training before being appointed to teach such a module. They have added that this lack of pre-practice and ignorance of the subject engendered serious problems for them such as malaise, lack of confidence as well as a reluctance to teach ESP, in general. One can deduce that the lack of ESP training constitutes an impediment to the achievement of ESP objectives.

*Question 6 : Class size and its effect on the teaching/learning process*

The teachers were unable to give an approximate number of the students attending the ESP course. They only replied that, in some instances, it happened to them to have too large classes to the extent of searching for a larger classroom or lecture hall to give their ESP courses, whereas in other cases, the number of the students was too few to give a course.

This variation in the size of classes was reported to be due to two main reasons :

The teachers do not check or mention substantial absenteeism on the part of the learners who are aware of this fact. Therefore, the students do not attend regularly ESP sessions because of personal or impersonal motives such as their lack of motivation or inadequate time- tabling

The teachers are, sometimes, compelled to gather two or three groups of ESP learners from different levels and different fields during a single session because of other primary commitments (at the secondary or tertiary levels) and time constraints; even if this is contrary to learners' benefits

Students' irregular attendance and the constantly changing learning conditions tend to inhibit seriously the teaching learning process. Both of the teachers and students feel lost and unable to carry out their respective tasks at the same pace and to fulfil learners' needs. This also affects negatively on teachers' and learners' motivation towards ESP teaching and learning, respectively.

*Question 7 : The weekly time devoted to ESP teaching*

The teachers, unanimously, indicated that their ESP courses were attributed one hour and a half teaching time a week. However, they added that, in the majority of cases, such sessions were, reduced to one hour only.

According to the informants, this change in the teaching load was due to teachers' or learners' delay, weariness or fatigue – since most of ESP courses were planned to be the last sessions of the day; or simply because some courses did not require more than one hour teaching time to be completed.

The teachers indicated that a session of one hour and a half a week is far from being sufficient to make any improvement with the learners, and renders the teaching task very difficult. They endorsed the points made by the students who were greatly convinced that this teaching load was, really, not enough to reach course objectives. This means that extra hours are needed (See 3.3.2.).

Moreover, the teachers wondered why these teaching hours were planned at the end of the day or the week claiming that these hours were not allocated at optimum teaching time.

*Question 8 : Students' level of proficiency*

The teachers replied that their students were to be considered as beginners, in general, even if they had some years of previous experience with the English language before their post-graduate studies. The teachers link this shortcoming with the total absence of English instruction during three years at the tertiary level and, therefore, with the nature of the English courses provided to the students during their fourth year of graduation. Such courses which were supposed to be ESP ones focussed, instead, mainly on refreshing learners' memories in general knowledge of the English language.

Nevertheless, the teachers added that there were some students with an intermediate level who made the exception. However, their level did not improve and remained the same as the courses proceeded.

*Question 9 and 10 : Students' motivation and attitudes towards the English course*

The teachers answered that the students were, generally, highly motivated and had a positive attitude towards the English course. This was due to students' awareness of the prominent place held by the English language to perform their target needs. However, the teachers insisted on the fact that such enthusiasm and empathy; i.e. high motivation and positive attitude; were prevailing or displayed during the first sessions of the year, mainly, but as the courses proceeded the situation changed as the learners began to realize that the courses provided neither met their requirements nor catered for their lacks.

*Question 11 and 12 : The existing teaching aids*

As far as these two questions are concerned, the answers were unanimously negative : the institution did not provide either syllabus or teaching materials for ESP teaching. This lack of materials constitutes, therefore, an additional negative factor for the teaching and learning of the target language.

The teachers replied that such a situation compelled them to have recourse to some already published materials taken from different sources. Such materials were, in the majority of cases, not adequate to the teaching/learning situation, students' level and field of study. In other cases, the teachers tried to devise and use their own materials, but these were frequently, again, unsuitable for the type of learners they were dealing with. In other words, the content provided failed to cater for learners' needs and lacks.



Furthermore, the teachers mentioned that practice during the course was very limited and systematic so this gave a chaotic aspect to ESP teaching.

*Question 13, 14 and 15 : Dealt with course content and conduct*

According to teachers' answers, a whole unit was dealt with in one to one hour and a half teaching time. Moreover; through they taught ESP at distinct periods and using different materials; the four informants agreed on the presentation of the same type of content. The lectures focussed mainly on the explanation and classification of the scientific jargon present in the text under study. To meet this end, the teachers had great recourse to students L1 and L2 but never English. Then, the students were given some exercises and, as a final step of the course, translation of English excerpts into French or Arabic was encouraged.

At this level, the investigator asked for further classifications concerning the importance devoted to each skill during ESP courses. It appeared that the teachers focussed primarily on the listening skill since they reported spending a relatively long time (period) reading and explaining the text under study whereas the students kept almost silent and trying to comprehend it.

Reading and speaking were integrated in a limited way. This integration was mainly restricted to students' practice during the reading comprehension phase of the selected texts. On the other hand, the writing skill was accorded the least importance because of students' difficulties to produce simple pieces of writing. This skill was, thus, substituted by translation from English to Arabic or French.

ESP aims essentially at developing and improving students' communicative ability so as to perform their target needs. However, it is apparent from teachers' answers that the method actually applied to teach ESP provides hardly enough time for the learners to actively participate in the learning process and, hence, in the target situation. The work to be done must always be in relation to their present and target abilities so that they gain confidence and their level of "alimention" is reduced. However, what is actually happening in those and probably other ESP classes is very often isolated and predictable sentences that are expected from the learners.

*Question 16 and 17 : Arabic and French interferences*

Arabic and French are highly used by the ESP teachers especially when reading and explaining the text under study, as the learners face great difficulties to understand the jargon it includes.

As far as the students are concerned, the teachers gave the following specifications :

- Arabic and French interferences may occur at the phonic level (spelling, pronunciation, intonation, and so on) as well as the syntactic level (such as with word order)
- Pronunciation which sounds like French or Arabic may induce the students into making errors



- Most students think in their L1 or L2 and, therefore, construct sentences according to the Arabic or French patterns whereas they are supposed to give English sentences. However, two respondents specified that, despite its interference, French is sometimes a helping tool especially at the lexical level

*Question 18 : The appropriacy of the content provided*

The informants' answers were unanimously negative. They claimed that despite their efforts to provide an adequate content using the means available (See answers 12 and 13), they failed to cater for learners' lacks and target needs. They linked such a fact to the lack of support from the Department' administration and staff; i.e. no syllabus, no teaching materials and no help from subject-teacher; on the one hand, and the limited time allocated to ESP teaching; i.e. insufficient hours and years of ESP courses; on, the other hand.

*Question 19 : ESP teaching problems*

- All the teachers interviewed agreed unanimously on the following obstacles :
- The absence of a definite language syllabus to provide a plan for ESP courses
- The lack of suitable teaching materials which constitute a necessary tool to guide the teachers and whose shortage tends to render the teaching of the target language ineffective
- Students' poor knowledge of the language and the heterogeneity of the groups. This makes it difficult to devise materials that cater for all learners' lacks and requirements
- The high and frequent interference of students first and second languages during ESP courses
- Students negative attitudes towards the English course. This is mainly reflected in their frequent absences and the irregular size of the ESP group
- The insufficient number of hours and years allocated to the teaching of the target language, in addition to the break English instruction for three year at the tertiary level
- The lack of personal and professional contact with subject teachers/specialists.
- Finally and most importantly, these teachers suffer from at the lack of ESP training and from a severe shortage in scientific jargon, in general, and subject-knowledge, in particular.

*Question 20 : Teachers' opinion and suggestions concerning the ESP weekly teaching time*

The interviewers argued that the weekly teaching time of English, at this level was insufficient and that extra hours were required. They went further by suggesting three to five hours a week in order to deal with learners' lacks, needs as well as wants.

*Question 21 : Teachers' opinions and suggestions concerning the number of years of English course*

All the teachers considered that two years of English courses, one at the tertiary level and one at the post-graduate level, were far from being enough to reach course objectives and learners' target needs. They suggested that students' exposure to the English language should be continuous since the first year of their tertiary studies. Such a relatively long period would enable them to be initiated to and move gradually from general scientific to subject-specific language use.

*Question 22 : The necessity of the collaboration between the language teacher and the subject specialist*

The respondents answered positively and gave the following reasons :

- Hutchinson and Waters (1987) support this view by asserting that, Both of the language teachers and subject teachers are important in the teaching of ESP.

***Co-operation should be a two-way process : the subject specialist can help the ESP teacher in learning more about the learners' target situation. At the same time, the ESP teacher can make the subject specialist more aware of the language problems learners (and ESP teachers) face.***

(Hutchinson and Waters 1987 : 164)

- The collaboration help the language teacher to limit the linguistic areas as well as the appropriate skills to be focussed on
- Language teachers, with the help of the subject specialists, identify the type of texts and tasks students need to deal with in order to improve their specific-field performance

*Question 23 : Teachers remarks and suggestions to improve ESP teaching situation :*

In order to improve the ESP teaching/learning situation, the teachers have given interesting suggestions concerning the different areas of the language learning context. These are summarized in what follows :

- To provide an appropriate syllabus designed on learners' target as well as learning needs
- To provide suitable teaching materials which fit students' level, make teaching easier and encourage language practice



- To make the students in contact with authentic uses of the target language through the use of audio-visual aids or published research articles
- To give English its due status in the curriculum and increase the number of years and hours of ESP courses
- To provide a specialised training for ESP teachers
- Language teachers have to work collaboratively with subject specialists for mutual benefits, on the one hand, and for learners' interest, on the other hand.

### **3.4. Commentary on the Main Results :**

Classroom observations, students' questionnaires and teachers' interviews have enabled us to collect a considerable amount of data concerning the state of the art of ESP teaching and learning in the Department under study. On the basis of the requirements of the target situation (See 3.2.), the analysis of this data will allow to determine the gap existing between students' actual level of competence and the target one.

The data collected revealed an important and affecting lack in students' knowledge of the language, i.e. in grammar, vocabulary, phonology, and so on. One can also point out to the total absence of both accuracy and fluency in writing and speaking.

Such difficulties have a negative effect on students' level of competence and motivation towards the teaching/learning situation which does not provide enough and considerable contact with the target language. In other words, ESP courses do not cater for learners lacks and expectations since the needed skills and language knowledge are absent from the content provided to them. One has to keep in mind that such students are postgraduates and, thus, specializing in the field of Physics. They need, therefore, to be confronted to subject-specific themes and language practices. However, the content presented to such students is still a matter of general science whereas language skills are dealt with unsystematically and in a superficial way, only. These characteristics give ESP courses a chaotic aspect.

#### **3.4.1. Learners' Lacks :**

After the identification of the requirements of the target situation and the different areas of language use to fulfil learners' needs, it is necessary to consider the gap that exists between students' present knowledge of the language and the one required in the target situation in order to determine their lacks. In other words, the investigator aims at sorting out the necessities that the learners lack. Such a process is referred to as deficiency analysis (Jordan 1997). It is a process through which both learners' present needs and wants are taken into account (West 1993).

The data collected revealed, in general, that students' level of competence was somehow poor. Their lacks have been determined through a thorough consideration of

the type of errors sorted out from class observations, students' questionnaires and teachers' interviews, of which learners' evaluation was an essential parameter. Students' lacks were essentially of a linguistic nature.

Since English is a foreign language, learners' errors have been described through the process of contrastive analysis. It is "*... a systematic comparison of specific linguistic characteristics of two or more languages*" (Van Els et al. 1984 : 38)

In his book *Introducing Applied Linguistics* (1973), Corder clearly shows the usefulness of contrastive analysis to examine the differences and similarities between languages. Nevertheless, contrastive analysis' greatest concern is "interference". It takes the position that learners' first language interferes with their learning of a second language and, therefore, constitutes a major obstacle to successful mastery of a new language. Furthermore, such a process enables to deal with error analysis defined as : "*... a technique for identifying, classifying and systematically interpreting the unacceptable forms produced by someone learning a foreign language.*" (Crystal 1985 : 112)

Weinreich (1953) has played an important role in the development of contrastive analysis, which is also labelled "negative transfer". In other words, the analysis of learners' errors will rely on the result of a negative transfer of words, expressions and grammatical rules from one language to another (Brown 1993).

What follows is a presentation of the linguistic errors made by the learners at different levels. These are essentially in phonology, vocabulary, and grammar.

### A-Phonology :

It has been noted that the learners observed encounter serious phonological difficulties. Relying on their knowledge of Arabic and French, they witness a considerable negative transfer at the level of phonology.

As a great number of English sounds is shared with the French consonantal system, errors tend to occur less frequently with consonants than with vowels. Nevertheless, one may note the following errors in the use of consonants, as illustrated in the following table :

<i>Examples of words</i>	<i>The wrong pronunciations</i>	<i>The right pronunciations</i>
Energy	/enərzi/	/enərdzi/
Isolated	/aɪzdleɪtɪd/	/aɪsəleɪtɪd/
Equation	/ɪkwəsiən/	/ɪkweɪzn/
Earthquake	/ə :tkweɪk/	/ə :Okweɪk/

**Table 3.9 : Students Mispronunciation of Consonants**



Errors may also occur with English vowels, diphthongs and triphthongs which are often shifted to Arabic or French vowels for phonological convenience. Examples of such occurrences are given in the table below :

<i>Examples of words</i>	<i>The wrong pronunciations</i>	<i>The right pronunciations</i>
Plasma	/pla :zmd/	/plæzmə/
While	/wil/	/wail/
Power	/pɔ :wær/	/paʊər/

**Table 3.10 : Students Mispronunciation of Vowels**

Negative transfer is noticeable in the use of stress and intonation, too. This results from carrying over some of the Arabic language habits into English as Lado (1957) puts it : “ *We tend to transfer to that language our phonemes and their variants, our stress and rhythm pattern, our transitions, our intonation patterns and their interaction with phonemes.*” (Lado 1957 : 11)

Such a problem occurs, mainly, when reading full sentences. The learners behave, in terms of stress and intonation, as if they were reading a sentence in their first language. As an example, one may cite the following :

Scientists    mea'sure    earth'quakes    according    to 'two    scales

Though learners encounter variant lacks at the phonological level, exceptions do occur with some words of a quite common use.

### **B-Vocabulary :**

The learners are also suffering from an important lack of vocabulary both in terms of general English; i.e. general knowledge of the language; and technical vocabulary; i.e. scientific as well as subject-specific jargon.

At the lexical level, students' errors fall within the following areas :

#### **-Distribution :**

Unlike the Arabic and French languages, English contains a number of words which can function as verbs or as nouns, according to the context in which they are used, such as :

To cause / a cause                      to measure / a measure

To force / a force                         to study / a study

Such a distribution can not be easily grasped by the learners, as argued by Lado (1957) who states that : ***"It is difficult for the foreigners to grasp the distributional forms of words in English."*** (Ibid., :76)

In other words, these particularities of the English language tend to seriously baffle the language learners.

#### **-Cognates :**

Cognates, or words sharing the same characteristics such as spelling, do not exist between Arabic and English. However, the situation is completely different when it comes to French and English. In these two languages, cognates occur very often, as the following words : experience, movement, development, system, signal, combination, and so forth.

Students often make use of the transfer of French words into English as a strategy to get their message or meaning across. The problem is that, in many instances, they tend to generalize the use of the rule of cognates to the use of French words to the extent of failing to convey any meaning in the English language.

#### **C-Grammar :**

Interference of Arabic and French is also noticed at the grammatical level. In other words, the target learners tend to transfer the grammatical structures of their first and second languages to the English language. In most cases, such a transfer is done unconsciously, as Lado (1957), once again, posits :

***We know from the observation of many cases that the grammatical structure of the native language tends to be transferred to the foreign language... We know that this transfer occurs very subtly so that the learner is not even aware of.***

(Ibid., : 58)

With respect to the learners under consideration, they encounter serious grammatical problems displayed in different areas such as word order, tenses, the passive voice, auxiliaries and articles, among others.

The following set of incorrect grammatical examples has been drawn from data collection and from a series of students' first examination papers, through which the results previously mentioned have been confirmed.

#### **-Word Order :**

The students have great difficulties producing correct well ordered sentences, be it in their spoken or written forms. In some cases, one of the sentence elements; i.e.



subject, verb, complement, or other; is missing. For instance, the learners tend to use either the auxiliary or the participle of the verb in the case of complex tenses, whereas the correct form requires the use of both. For example :

The student says : \*The results have checked twice

Instead of saying : The results have been checked twice

In other cases, even if no sentence element is missing, it may be misplaced; as in the following example : \* Temperature low. This is due to the fact that in Arabic, the adjective is placed after the noun and no auxiliary is needed whereas in English, the adjective comes before the noun or after the auxiliary "to be". Thus we may say : low temperature or temperature is low.

### ***-Auxiliaries and Negatives :***

The auxiliaries "do", "does" and "did" used in English questions and negations do not appear in French and Arabic. Hence,

• In the case of Arabic Interference : the student may use the following sentences to :

– Ask a question :

\* Is the generator creates energy?  
(هل المولد ينتج الطاقة؟)

Instead of : Does the generator create energy?

– Give a negation :

\* The generator not creates energy  
(المولد لا ينتج الطاقة)

Instead of : The generator does not create energy

• In the case of French interference : the learner may say the following in order to

– Ask a question :

\* Is the temperature increases?  
(Est-ce que la température augmente?)

Instead of : Does the temperature increase?

– Give a negation :

\* The temperature increases not  
(La température n'augmente pas)

Instead of : The temperature does not increase

As it is illustrated in the above examples, there is the interference of Arabic and French in negative sentences. For the former, not is used as an equivalent of "لا", whereas for the latter not is used as an equivalent of "pas".

On the other hand, since French questions are asked either with the auxiliary "être" or the auxiliary "avoir", the auxiliary "to be" is often used as an equivalent by the students to ask questions in English.

### **-Pronouns :**

With regard to pronouns, the learners frequently use them simultaneously and more precisely after the words they are supposed to refer to, in a single sentence. For example, they may say :

\* Heat it is not a source but a form of energy.

(الحرارة هي ليست مصدر بل نوع من أنواع الطاقة)

Instead of : Heat is not a source but a form of energy.

This redundancy of the pronoun is found in literal translation from Arabic. Moreover, the learners find difficulties in drawing a distinction between the relative pronouns and their language use to form clauses. Such pronouns include : which, who, what, where, when, etc.

### **Tenses :**

As far as tenses are concerned, different types of errors have been identified mainly with :

- The present simple especially with the third person singular where the (s) is often omitted

*Example :* \* The composition of the gas depend strongly on its temperature

Instead of : The composition of the gas depends strongly on its temperature

- The simple past where the students do not distinguish between regular and irregular verbs

*Example :* \* The experience begined at 10.00 a.m. and ended at 10.55 a.m.

Instead of : The experience began at 10.00 a.m. and ended at 10.55 a.m.

- The use of the past participle where the students confuse between the past participle, the present simple and the simple past of the verbs.

*Example :* \* The system studies comprises many sub-systems



Instead of :           The system studied comprises many sub-systems

- The complex tenses, the students avoid as much as possible using such forms as the present and past perfect, the present and past continuous and the future tenses.

#### ***-The Passive Voice :***

Concerning the passive voice, the omission of the English copula has been noticeably observed because of its inexistence in the Arabic language, mainly. Therefore, it is possible to hear or read utterances of this kind :

- \* It confirmed by the results obtained   or   \* It is confirmed the results obtained

Instead of :                           It is confirmed by the results obtained.

One has to mention that the passive form is a significant feature of scientific English. Thus, it has to be taken into account when designing any remedial work.

#### ***-Articles :***

Each of the French and English languages contains the definite and indefinite articles whereas Arabic includes the definite article, only. Such a fact causes a problem for the learners who either omit the article or put it wrongly, as noted in the following example:

- \* Atom has equal number of electrons and protons

Instead of :           An atom has an equal number of electrons and protons

There is also the case of abstract nouns where English uses no article, such as the word "energy", whereas the definite articles "le" for masculine and "la" for feminine are used in French and "ال" for both genders in Arabic.

#### ***-Adjectives and Adverbs :***

With respect to adjectives and adverbs, the latter are very rare in Arabic while the learners tend to use adjectives too much and wrongly, as in the following example :

- \* An earthquake general lasts a few seconds

Instead of :           An earthquake generally lasts a few seconds

The learners often mix up and misuse adjectives and adverbs in English, as Smith (1987) asserts : ***“There is frequent confusion between the adjective and adverb forms in English, and the adjective form is usually overused.”*** (Smith 1987, p.150).

It is worth mentioning that the learners have also problems with spelling because of the lack of exposure to and practice of English reading and writing, and because of the interference of the French language.

In sum, one may say that language interference is a fact. In other words, all languages have some common and different features which can be transferred positively or negatively during the learning and the use of the target language. It is towards this that contrastive analysis functions. Moreover, such a process aims to determine learning difficulties and depict problem areas and errors which can take place during the learning of the foreign language. It also enables the language teacher to design relevant and appropriate materials so as to cater for learners' lacks and needs.

#### **D-Additional Lacks :**

In addition to learners' linguistic impediments, mentioned earlier, other lacks have been noted by the investigator. These revolve around the following points :

Instead of the rowing importance of ESP which is considered as an opening to the technical and scientific world, neither its status, nor the role of such a teaching have been clearly defined. This means that ESP is not yet treated as of equal importance as general English. This fact generates a number of gaps to be bridged.

The inexistence of a specific ESP syllabus in most scientific and technical Departments. Some leeway is given to the language teacher to devise his own syllabus. Thus, one wonders if this ad hoc syllabus is appropriate to cater for learners lacks and target needs.

Besides the absence of the syllabus, ESP teachers suffer from a serious shortage of materials in the Department under concern and probably elsewhere, i.e. other Departments. Hence, they are left to themselves to supply and write their teaching materials even if this is a complex and time consuming task.

Language teachers are asked to teach ESP without any previous training. This point is supported by Robinson (1980) who states :

***A serious problem for ESP in many parts of the world is the provision of an adequate supply of teachers. In most cases, the people teaching and administering ESP programmes have themselves received no special training in ESP.***

(Robinson 1980, p.75)

This creates serious problems for the language teacher such as a lack of self-confidence due to his ignorance of the subject and a lack of mastery of the specific language, which sometimes result in a reluctance to teach ESP, in general.



Moreover, ESP teachers suffer from a lack of co-operation from the part of the subject specialists.

Owing to all the listed problems, the so-called ESP teachers are working randomly. This is reflected in the quality of their teaching. The researcher views the content of the ESP courses as somehow limited and embarking the learners into a series of mechanical habits. This makes English sessions monotonous. Moreover, the learners are unable neither trained to provide any type of language output.

### **3.4.2. Learners' Wants and Expectations :**

When given the opportunity to give their viewpoints, the students expressed their disagreements towards the type of content they were presented to. One has to remind that the learners under consideration are post-graduates who are already confronted to the target uses of the English language. In other words, they are well aware of their needs and, hence, of the gap existing between the knowledge provided and the one required to reach their objectives. On the whole, the students suggested lectures which :

- Consider thoroughly their target needs and level of proficiency
- Involve pieces of real-life English
- Provide activities which remedy their lacks, on the one hand, and involve practice in the target uses of the language, on the other hand.
- Vary the activities so as to awaken and sustain their interest and motivation

Furthermore, the learners expressed their desire to be involved and participate in the selection and design of what to be taught, since they are already confronted to the target uses of the English language.

### **3.5. Conclusion:**

This Chapter has concentrated on analysing and interpreting the data collected about students' target needs and the present teaching/learning situation. The results obtained revealed the existence of a considerable gap between students' level of proficiency and the one required in the target situation. The learning conditions and the materials provided do not cater for the target needs of the learners who present serious lacks, mainly at the linguistic level. Moreover, extra pedagogical problems engendered by the educational system, such as the lack of syllabus, teaching aids and teachers' training as well as time constraints, tend to worsen the ESP teaching situation. All these shortcomings are to a great extent responsible for students' difficulties and failure. This is why, it becomes of primary necessity to try to remedy these lacks and suggest some

alternative solutions to improve and render the ESP learning situation more efficient. This will be the concern of the subsequent chapter.



# *CHAPTER FOUR*

## **Chapter Four :** **RECOMMENDATIONS**

### **4.1. Introduction :**

For the sake of an upturn regarding the present ESP teaching/learning situation, the investigator will try to focus, in this part of her work, on providing some suggestions and remedial actions with the hope to overcome or at least lessen the problems and shortcomings identified in the previous chapter. To meet these ends, the researcher will endeavour to recommend a more adequate way of preparing and conducting the ESP courses required. Accordingly, some suitable sample units will be designed. These will involve a series of activities and tasks hoped to be adequate to remedy students' identified lacks and meet their target needs.

As there is no teaching guidance, no training for the teachers and no assistance from the administrative staff, further suggestions about teacher's preparation and teacher's roles to reach course effectiveness will be set.

The researcher expects that the recommendations proposed may improve the teaching of English in the Department of Physics and why not in other similar ESP teaching/learning situations.

### **4.2. Recommendations :**

The first part of this last chapter try to introduce some pedagogical reforms and suggest a more adequate process for the design of effective ESP courses for the learners in question.

#### **4.2.1. Administrative Reforms :**

After a thorough analysis of the present ESP teaching/learning situation, (See Chapter Three), the researcher considers that some administrative reforms should be implemented first before the provision of any ESP instruction. Such changes are intended to better prepare the learners to undertake their English courses, or the one hand, and to review the place of English in the curriculum, on the other hand.



**(i) Pre-Sessional ESP Courses :**

It is agreed that the amount and kind of communication that occur in the ESP classroom under study are respectively insufficient and inadequate to ensure the development of full target language competence in its wider sense. Moreover, one has to emphasize the fact that the learners in question have had no ESP preparation before entering the university. Besides, they come from different language environments essentially technical schools and general schools where they received a certain type of knowledge and practice of the English language with huge gaps and differences between the circular designed. These facts; i.e. no previous ESP instruction and the different English language background, added to the inexistence of English during three tertiary years; resulted in the heterogeneity of the ESP group and created an important intellectual and linguistic vacuum. Consequently, the learners are suffering from considerable lacks and face important difficulties once dived into the deep waters of the target situation. This is highly supported by the results obtained from class observations, students' questionnaires and teachers' interviews. The investigator suggests, therefore, that the students have to be both sufficiently and adequately prepared before undertaking their ESP courses. To meet these ends, it is recommended that they should be exposed to the English language even during the three first years of their graduation. Such an exposure will prevent the total absence of the target language during such a relatively long period which tends to weaken students' level in English, on the one hand. On the other hand, it enables them to reinforce their linguistic competence through a foundation course in Scientific English to serve as a basis for the ESP oriented courses, offered during the specialisation, which aim to impart the kind of communicative competence needed by the learners.

Such courses may be referred to as pre-sessional ESP courses and will allow time to reinforce and develop the basic skills and strategies of language learning and to move from general to scientific to subject specific language use and become, therefore, gradually familiar with the type of discourse required in ESP situations. As such, the teacher will make the learners pass from known to unknown, from the easiest to the most complicated, from the regular to the irregular and most importantly from general to specific. In sum, students must know how to walk before they run as Hutchinson and Waters (1987) put it : ***"Particulars are not to be examined, till the whole has been surveyed."*** (Hutchinson and Waters 1987 : .5)

The teachers of English should lay heavy stress and insist on the supreme importance of this elementary stage since it is these early lessons based on the fundamental steps of language that are going to determine the likely success or failure of the ESP course. These pre-sessional ESP courses will make it possible for the learners to be widely exposed to and to practise the basic functions of language (defining, classifying, describing things, and so on), its basic notions (time, space, locations, and so on) as well as a kind of minimal grammar through the use of tenses, adjectives, adverbs, articles and so on. They allow the learners to strengthen than their language background, to remedy their lacks in the target language and tend to render the ESP group more homogeneous. As a result, the learners will be better prepared to undertake their ESP courses and all what these imply in terms of language skills and study skills practice. The teaching task will, therefore, become more efficient since the teachers will no more concentrate on refreshing learners' memories or revising the basic



grammatical structures, things which would demotivate the students at this level; but on providing adequate ESP courses going hand in hand with learners' target needs, wants and expectations.

Furthermore, it is worth-remembering that, besides the teachers interviewed, the learners too expressed the same desire of having preparatory English courses since the first year of their graduation and went further by suggesting the prolongation of their ESP courses till the second and final year of their post-graduate studies. This reflects the prominent importance and need of the English language to prepare them to undertake their specialisation and to ensure their success in the target situation. It also mirrors students' positive attitude towards the target language which is an important factor to help them improve their language ability. Thus, one may state that although the students' background in English is weak, they are motivated and willing to spend more time in improving their level.

Furthermore, we have to recognize that the early and the longer students' exposure to the target language is, the more favourable it will be for them because this helps them to become active and independent users of the language. Besides, no matter how such an exposure lasts since it remains a relatively short period compared with students' further academic or professional careers.

#### **(ii) English in the Curriculum :**

Although English is a compulsory module and is of paramount importance for the learners to behave effectively in the target situation, it is still regarded as an additional module and less important than the others included in the curriculum of Physics. This is highly because of the fact that its coefficient is one, only, whereas those of the main subjects vary from two to seven.

In view of the utility of the English language, its coefficient should be increased to two or three, at least. This will give English a higher status in the curriculum and a greater consideration from the part of the learners, the teachers and the administrative staff. Furthermore, the students do not get more than one English session of one hour and a half a week, often reduced to one hour only. This teaching time is very restricted and reported to render the teaching task very complex and difficult. To promote ESP, the researcher recommends three to four hours a week which could be a reasonable teaching load required to attain course consistency and effectiveness and to fulfil learners' target needs. Furthermore, it would be better if the English teaching time could be reconsidered and planned in the morning instead of falling at lunch time or at the end of the day.

#### **4.2.2. Important Considerations :**

Before suggesting any plan for the course design process, hoped to be adequate for the situation under study, it would be fruitful to take account of a number of considerations, first. These are of equal importance as learners' target requirements and

constitute, too, the basis upon which syllabus objectives and, therefore, the courses that will be designed are set.

ESP training in our specific context will last one year only; Before the design of suitable units for first year post-graduate students, it is important to note what follows :

- The learners are confronted to language use in real-life situations alongside their ESP training;
- Language use in real-life situations will continue and grow as the students advance in their academic and/or professional careers;
- The learners will receive no additional ESP training in the target situation;
- By the end of their training, the students must be able to communicate effectively for academic and/or professional purposes.

Moreover, the learners display several considerable lacks (See 3.4.1). These have also to be taken into account when designing the syllabus and course materials.

### **4.2.3. The Syllabus :**

If in language teaching, the teacher is often faced with an inadequate syllabus, the problem with ESP teaching lies in the inexistence of a syllabus. The situation under concern is no exception as this has been unanimously acknowledged (See Chapter Three). Freedom is given to the ESP teacher to devise a personal syllabus which is in the majority of cases unsuitable for the target learners' needs. However, it should be recognized that the elaboration of a particular syllabus for specific learners is not an easy task to fulfil and requires a painstaking effort from the part of the teacher. Moreover, the ESP teacher has received no specialised training to materials design and lacks any support from the administrative staff. He has, in the majority of cases, a mere superficial idea about the requirements of the target situation and, accordingly, courses objectives.

Since ESP learners need to use English appropriately in order to handle communication acts in the target situation, ESP syllabus have to be communicatively based (See Chapter One). Nevertheless, this does not mean that grammar teaching should be neglected but it should be introduced through the teaching of functions. Moreover, a syllabus which seeks to teach students how to communicate in whatever specific field should acknowledge the complexity of communication because it can hardly be framed in only on aspect of the language; be it functions, notions, structures, skills, content, tasks or whatever; unless it will not reach the objectives set. Furthermore, the proliferation of students' target needs; i.e. in terms of skills and study skills; and the state of the art of the situation under study; i.e. learners' important lacks and time constraints; urge the investigator to suggest the adoption of a synthetic and eclectic approach when designing the syllabus in order to enable the students to develop the required competence rapidly and effectively. Thus, it is essential to combine and



mix different types of syllabuses and use a “multi-syllabus” which emphasis on and provides training in language skills, study skills, structures, functions, notions, content, tasks and situations, etc. Besides, it is worth-mentioning that this mixture of approaches to syllabus design is quite usual and highly desirable especially in an ESP context, since it embarks the learners upon various uses of the English language that cater for the requirements of the target situation.

Moreover, when constructing any syllabus, one has to keep in mind that whichever the content selected, it has to be sequenced and presented in a gradual manner in order to be more efficient and better assimilated. At this level, it will be possible to design appropriate ESP courses.

#### **4.2.4. The ESP Course Gestation Process :**

The investigation undertaken in the two previous chapters has shown that the current ESP course design process presents a major drawback since there is no previous analysis and no account of the ESP learning situation. A typical consequence of this is that the teacher is put in the untenable position of having to devise and teach materials at random and which fall to match course objectives. The learners are provided with uninspiring content and language exercises which fall to match course objectives. The learners are provided with uninspiring content and language exercises which lack any clear communication focus. Therefore, the development of their capacity to communicate effectively in the target situation is completely neglected. For this reason, it is advisable for the course designer, who is also the language teacher in an ESP context, to carry out a rigorous identification and analysis of students’ target needs in order to sort out course objectives before the production of any teaching materials. Moreover, as no guidance is offered to the ESP teacher in order to undertake such a task, the researcher will try to suggest, in this part of the work, how an ESP course could be designed and conducted.

Far from restricting the teacher’s work in the classroom, a good lesson plan should allow for guidance, greater freedom and enhancement of the learning process. It does not only guide the teacher’s activities in the classroom, but also gives him a sense of direction in his teaching and helps to attain progressively the boarder more general aim of the whole course.

In order to design appropriate courses, hoped to cater for students’ target needs, lacks as well as wants, the researcher suggests the following steps, the first of which is the selection of appropriate themes.

**(i) Themes:**

Theme selection is of crucial importance in the course design process, especially at this level. One has to recall that in our specific context, the ESP learners are post-graduate students who are specializing in the field of Physics, on the one hand, and already confronted to the target uses of the language, on the other hand. This is why, it is available, if not necessary, to select themes that belong to students' specialisations. Such themes can also be suggested by the subject specialists or by the learners themselves, i.e. learners' wants have to be taken into account in materials design (See 1.8.1. iii .(a)).

Moreover, when the students have an identifiable and real-life need for studying the language, they tend to lack motivation in learning English and regard this latter as an imposition if they are confronted to themes which are irrelevant to their field of study. Consequently, the more closely and overtly a selected theme can be associated with students' area of interest, the least time is likely to be wasted and the more learners will be motivated to work and to deal with the content provided, accordingly.

**(ii) Texts Selection:**

After the choice of the appropriate themes that will be the subject matter of the units, the language teacher will have to deal with the selection of the right texts for language practice, which is not an easy task. Since the learners in question are already handling the different target uses of the language, the ESP teacher has to make great efforts for the provision of authentic texts for study : such an exposure is the most desirable and the more fruitful at this level merely because of the orientation towards a definite purpose. In this sense, Meads (1978) posits : "*The efficiency of ESP materials should be measured by the degree to which the student recognizes their relevance to his immediate needs*" (Meads, 1978 : 12)

Thus, in addition to assuring course effectiveness, authentic texts are intensively motivating and beneficial. This is why such an exposure should be as extensive as possible for the learners and should occur from the beginning of the course. The original texts selected should encompass those text genres that the learners are expected to become familiar with and to produce for academic or professional purposes. These materials may be taken from various subject-specific sources including scientific or technical textbooks, up to date magazines and newspapers, and specialised journals and articles, written by native or non-native speakers of the target language.

Text authenticity allows the identification of and the familiarity with the level of formality, level of semantic difficulty, the specific vocabulary, the rhetorical devices and even the grammatical structures and the characteristic organizational principles found to occur more frequently in the target uses of the English language. Moreover, the ESP teacher has to be cautious about the selection and use of authentic texts since besides their role as representatives of language use, they have to be effective instruments of language learning. In other words, it is recommended to avoid the blind use of authentic texts in the sense that they represent particularities of specific situations but such materials should have a pedagogical purpose as well in order to reach course



objectives. This means that in using a text, the question that should be put would not be "Is this text authentic?" but rather "What role do I want the text to play in the learning process?". In other words, we should be looking at the fitness of the text to the teaching/learning purposes (Hutchinson and Waters, 1987). Morrow in Robinson (1980) strongly recommends that every text should have a "topic, function, channel and audience" that are particular to it in order to suit the target situation. Hence, the language teacher has to take into account the possible drawbacks of authentic texts. Their use in an ESP context should be "*... the means by which he (the learner) can bridge the gap between classroom knowledge and an effective capacity to participate in real language events.*" (Wilkins 1976 : 19).

For this reason, the language teacher has to investigate the target needs of his learners and teach the language in use in the particular situations relevant to his students' field of study. In sum, authentic texts can be adopted, adapted or abridged if we feel that this would improve its pedagogic usefulness. Nevertheless, such materials have to be strikingly interesting in the first instance, suited to learners' needs and interests and capable of generating a lot of useful and interesting classroom activities so as to reach the objectives sought for.

### **(iii) Language Activities:**

It happens that even with the use of interesting authentic texts, the ESP teaching/learning situation remains unsuccessful. The main reason lies in the fact that such materials are used in an interesting way because too much of the preparation time has been spent in looking for them and not enough in their exploitation. For this reason, it is advisable that after the selection of relevant texts, the ESP teacher has to plan and devise a series of adequate activities for the sake of overcoming students' weaknesses, catering for their needs and attaining course objectives.

The analysis of the situation under study has revealed that the students require a knowledge of the four skills, i.e. an ability to read, write, listen and speak using the English language (See Chapter Three). Moreover, it has been noted that the learners presented severe lacks in these areas which received any remedy, and this affected negatively students' motivation towards the ESP course. Accordingly, the rationale behind the different types of activities suggested hereafter is to enable the students concerned to develop their language skills, arouse their motivation, sustain their interest and encourage them to make predictions. Such activities will be graded in terms of difficulty in order to be challenging, and varied to avoid boredom, excite the learners and help them cross the first hurdle of language learning and language use for communicative purposes. The activities recommended will appear under the following heading :

#### **a. Listening Comprehension :**

The listening skill receives special attention in communicative courses especially because it has been longly neglected as a skill on its own right.

After a warm-up activity during which the learners are made familiar with the main theme of the unit and invited to speak freely about it using mainly English, the text selected to be the representative of the theme under concern is presented orally, first, to the learners. Nevertheless, such a presentation should vary as the courses proceed. During the first sessions, for instance, the learners may listen to the teacher reading the text understudy after having been provided with handouts containing such a text. Listening may become more complex if the teacher invites the learners to listen carefully to the text first before being distributed to them. In both cases, the language teacher should present the text aloud, carefully and through a step by step reading. By the end of each step, he explains the passages read, highlighting the key and complex items. As the learners progress, the listening comprehension phase may become more challenging with the introduction of audio-recorded real life listening texts. This will arouse learners' interest and progressively build up their confidence in their communication skills since decoding oral language is one of the most important areas of difficulty in the target situation (See Chapter Three).

However, the learners may have a great deal of difficulty with those naturally-occurring excerpts, this is why the ESP teacher has to consider the presentation speed, the level of difficulty of vocabulary and structures and the appropriateness of the context and the activities they allow for when selecting such materials. Gradually, the students may be exposed to continuous flows of English which display the features of interactional discourse which pose most problems and difficulties for the learners.

Whatever the form under which the selected text is presented, different types of activities can be planned accordingly to check students' level of oral texts comprehension. These activities can be :

- To select a text title;
- To give the number of paragraphs included in the text;
- To give a title to each paragraph;
- To determine true or false statements;
- To seek given information to fill in tables;
- To take notes as answers to pre-designed questions;
- To deal with vocabulary exercises.

Although listening comprehension represents the best introduction to the theme under concern, it is worth insisting that the listening skill has to be continuously encouraged throughout the course and integrated within the other skills in subsequent activities and units. This is necessary so as not to accustom the learners to have listening as a skill on its own since the situation is not so in real-life situations.



### **b. Reading Comprehension :**

After the listening comprehension phase, the learners are, if not yet, distributed the text chosen to present the theme under study. In order to ensure that the learners have an internal model of how a text should be read, the teacher should read the passage aloud, once again and several times if necessary, as the students follow with their eyes. Afterwards, some learners are asked to read the text aloud, too, since this is a good means to better pronunciation. Those readings (the teacher's and the learner's) may be followed by an oral text comprehension through oral class discussions during which the teacher encourages students' use of the target language as much as possible.

As previously mentioned (See Texts Selection), those passages must be of those text genres that the learners are expected to deal with and to produce in the target situation, i.e. expository, argumentative, exploratory, instructional, and so on. They may be presented under the form of reports essays, summaries, articles, excerpts from books, debates, and so on. Each of these genres will have its own context, structure, format, style and various conventions of which the learners should be made aware. Therefore, after giving the students an opportunity for silent and individual reading, it is up to the language teacher to introduce the right type of exercises which allows text comprehension. This can be achieved by means of some of these suggested activities :

- Skimming the text rapidly to obtain the gist of a passage or the main idea of the text;
- Scanning the text thoroughly to pick out the major points or extract the specific information required;
- Finding the type of the text studied, i.e. expository, exploratory, and so on;
- Answering comprehension questions using students' own words;
- Improving students' word guessing strategies, i.e. guessing the meaning of words from contexts;
- Distinguishing between true and false statements;
- Completion exercises;
- Transferring written information into the non-verbal form (tables, diagrams, graphs, and so on);
- Drawing inferences and conclusions.

These exercises have to be introduced gradually and graded in terms of complexity. Moreover, the teacher can ask his students to do them individually as he may encourage pair or group work.

### **c. Word Study :**

Vocabulary is an essential parameter to build listening, speaking, reading and writing proficiencies. Its teaching has been rather neglected in ESP programmes, as has been the case in general English, mainly because of the difficulties involved in teaching it rather than simply testing it. Moreover, it is highly dangerous to assume that vocabulary learning will take care of itself or that the learners will absorb words only by being exposed to them unless they are provided with concrete activities that enable word study. Such activities will allow the learners to master the use of general, sub-technical and specialist vocabulary encountered in their field of study.

The activities suggested to draw students' attention to systems in vocabulary can take the following forms :

- Words' formation;
- Words' classification;
- Words' relationships;
- Checking the meaning of words or expressions;
- Sentence construction using the studied words or expressions;
- Completion exercises;
- Substitution exercises;
- "Odd man out" exercises.

With the text in hand, the learners deal with each exercise on its own. By the end of each activity, they are invited to make correction on the blackboard.

### **d. Structure Study :**

Although ESP teaching is communicatively-oriented, the teaching of grammar should not be neglected but rather consolidated as the students experience the target language used in meaningful contexts. The activities designed in this section should focus as the grammatical points which are particularly important and frequently encountered in all scientific writings, especially those which represent continuing "trouble spots" for the target group. Classroom observations and students' questionnaires revealed that the learners needed a great deal of grammar adjustment to bridge the gap between their present knowledge of English and the output they should arrive at (See Chapter Three). Accordingly, the grammar lectures should emphasise the following points :



- The teaching of tenses of frequent use in scientific English such as : the simple present, the present perfect, the present continuous, the simple past, the past perfect, the past continuous as well as the future and the conditional;
- The passive voice. It has been reported that the passive voice and more specifically the impersonal passive is very common in scientific English (Allen and Widdowson 1974). It is frequently employed to describe a process where there is a need to focus on the process itself and the product rather than on those operating such a process. In other words, a scientist is more interested in the action rather than the doer;
- Word order;
- Sentence construction (Affirmative, negative and interrogative sentences).

Since grammar is mainly rule-based, rule-comprehension can be taught either inductively (the rule is given from particular examples) or deductively (particular cases are deduced from a general rule) depending on learners' levels, needs, difficulties and learning styles.

The students will have to deal with the different suggested activities. At the end of each, correction has to be made on the blackboard during which the teacher reinforces rule internalisation and comprehension and encourages students' participation.

#### **e. Language Use :**

ESP implies the use of language for communication purposes. This requires, thus, the introduction of language functions and notions to allow the students to handle the communicative acts required in the target situation. The taught notions and functions have to be based on the text provided and integrated within various types of activities. Moreover, they have to be representative of the general, scientific and subject-specific uses of the language and graded in terms of complexity as the units proceed.

The language functions that can be introduced during the teaching programme and which represent the writer's or speaker's intentions can encompass what follows :

- Defining;
- Describing;
- Explaining;
- Classifying;
- Comparing;
- Exposing a situation, facts;

- Giving instructions;
- Reporting;
- Requesting;
- Advising;
- Generalizing;
- Expressing a point of view;
- Expressing agreement/disagreement;
- Expressing approval/disapproval;
- Expressing possibility/impossibility;
- Expressing a result/ deduction / conclusion;
- Expressing judgment;
- Expressing intention;
- Expressing desires/wants;
- Expressing greeting/sympathy/gratitude.

As mentioned earlier, the teaching of notions has to be emphasized as well. They enable to link the language functions with the grammatical categories through which they are realised.

- The notions that may be included in the language programme so that the learners can handle communicative acts include the following :
- Point of time;
- Duration;
- Frequency;
- Sequence;
- Location;
- Dimension;
- Motion;



- Quantity;
- Grammatical numbers;
- Numerals;
- Operations;
- Commencement;
- Cessation.

#### **f. Language Output:**

As previously noted during class observations, except translating some passages into Arabic or French, the learners under concern did not present any personal production, whether written or spoken. This is particularly disapproving especially if we consider the requirements of the target situation. For this reason, activities which encourage language output have to be integrated as an essential step within the designed ESP courses. At this level, each of the writing and speaking skills of the learners have to be encouraged and developed through a gradual practice of the different types of writings required in the target situation. Cultivating effective written and oral communication skills is vital for the learners in question in order to fulfil their needs. Moreover, this is a complex process which requires a prolonged contact with subject-specific texts and a great deal of practice. It will make the learners aware of the structures of different types of writings before they can produce them. Additionally, it will train them to pay attention to the sequencing of their ideas and to the ways of connecting them so as to produce coherent personal productions of an acceptable value. Furthermore, each learner has to be aware of the purpose of his writing and the readership aimed at when producing any piece of writing because these will highly influence the form and the content of his production. Consequently, the learners have to be exposed to and trained to produce the different writing assignments required in their particular field of specialisation. Such a practice can begin with simple activities, guided and supported by the language teacher, before moving to more complex and task-solving activities in order to promote learners' self-reliance and autonomy. This is a pre-requisite in the target situation since learners' ESP training is of a limited and short duration.

The different writing assignments that the learners can be trained in include :

- Information transfer : from tables, graphs, diagrams, etc, to a text;
- Summary writing;
- Essay writing;
- Describing an experiment; a process, etc;

- Writing experimental reports; research reports; etc;
- Writing abstracts such as journal abstracts, conference abstracts, research abstracts;
- Writing articles;
- Individual research projects.

These tasks have to be integrated gradually. Moreover, the learners have to be trained to present orally their personal productions in order to better their pronunciation, develop their speech delivery and become more confident to contribute in real-life situations such as scientific meetings.

The models of genres dealt with in the classroom should not be treated as fixed-rule governed patterns but as prototypes which allow for individual variation.

#### **iv) Free Reading :**

The final section of the unit may be a passage of prose of one of the genres encountered by the learners in the target situation, i.e. a summary, an abstract, an excerpt from a subject-specific textbook, a lab-report, etc. This section should be included in order to provide an opportunity for the students to learn for and by themselves. The previous parts of the unit have imposed a fairly strict control over the language activities whereas this one will pave the way for the learners to try out what they have learnt in their own way and their own time. These reading passages will help them to develop their own and individual learning and will give them a chance to think for themselves without being imposed upon. Moreover, the readers' interest in the way language is used in scientific discourse has been sufficiently aroused throughout the preceding sections so as to be ready to apply their own intensive reading strategies without any further specific directions in the form of further exercises. Those passages may be accompanied with a set of questions aimed at fostering text comprehension and content assimilation, especially the scientific one.

### **4.3. Further Recommendations:**

Designing suitable courses is not a *since qua non* condition for the success of the ESP teaching/learning situation. Such a success rests, also, upon the learners and teachers own efforts and degree of involvement.



### 4.3.1. Promoting Learners' Autonomy:

ESP aims primarily at helping the learners become effective users of the English language in the target situation and so is the purpose of the suggested activities for course design (see 4.2.4.). Moreover, if one closely examines the successive steps recommended; i.e. the use of authentic materials from different authentic sources, engaging the learners in intensive readings, performing various activities and tasks of increasing complexity and producing language outputs; he will notice that alongside developing students' communicative competence, these courses seek at raising learners' awareness of their own and other learning styles and of the various methods of learning that can be used to cater for their lacks. In other words, these students are progressively trained to develop the skills required to perform their specific needs and use all the resources available inside and outside the classroom so as to become more responsible for their own learning and, hence, more effective and independent users of the target language. In sum, the suggested activities implicitly advocate promoting learners' autonomy. In this sense, Miliani (1991) posits that : ***"A great deal of importance is given to the learner in directed individualized instruction, self access learning, self-learning, autonomous learning. These have become today's slogans"***. (Miliani 1991: 103).

Therefore, autonomy should be an integral part of the expected outcomes of all courses and ESP is no exception. It is particularly important for ESP learners whose time in the ESP classroom is particularly limited. Besides, when this relatively short course finishes, students' self-reliance is highly required to cope with the requirements of the target situation. For this reason, ESP teachers should set their students on the path to full independence through the design of effective ESP courses.

### 4.3.2. Teacher' Qualifications:

When investigating the requirements of the target situation and the prevailing teaching/learning conditions, it has been deduced that alongside learners' need, lacks, wants and the course design process, the ESP teacher' qualifications and attributes have to be reconsidered as well in order to ensure course effectiveness and learners' success.

An ESP teacher is first and foremost a language teacher (Robinson 1991). As such, he needs to have three types of competence in order to perform efficiently his task. These encompass :

- Language Competence : competence in the target language of the learners which enables him to have a sufficiently sound command of English to teach effectively;
- Pedagogic Competence : the ability to teach effectively;

- Language Awareness : it involves not only the ability to use language but to reflect on it consciously as well. It is essential to allow the teacher to monitor language use and learning in the classroom.

In order to acquire such attributes, the ESP language teacher should be, first, well prepared through what is technically called a pre-service teacher training. This must include the different sciences involved in TEFL such as phonetics, linguistics, sociology, psychology, pedagogy, teaching techniques and methodology and so on (Miliani 1993). Moreover, besides theory, such a training should also pave the way for practice. This means that the trainees could be given the opportunity to observe teachers at work, after which they could be asked to teach a class under the trainer's supervision so as to be evaluated.

Yet, one has to realize that there is nothing specific about the principles underlying good ESP methodology and practice. The teacher who has come to ESP from general English need not to think that a whole new methodology must be learnt. On the contrary, the classroom skills and techniques acquired in general English teaching can be usefully put to use in ESP situations. Moreover, the ESP teacher needs to have a sound knowledge about the context to provide and the different areas to emphasize on depending on learners' needs for an effective teaching/learning situation. This leads us to speak about one of the prime requisites for an ESP teacher, which is Flexibility. This quality enables him to move from being a general language teacher to a specific language teacher and, hence, to cope with the different demands of his ESP teaching task. The ESP teacher does not only teach, however. He is often compelled to perform a concatenation of other simultaneous roles as a needs analyst, researcher, syllabus designer, course designer, materials writer, evaluator, in addition to taking an interest in and acquiring a knowledge of the students' specialist world. This list is scarcely exhaustive and, yet, makes it clear that the demands on an ESP teacher are highly considerable because of which the term ESP practitioner replaced that of the ESP teacher. Such demands require some further preparation and knowledge on the part of the ESP teacher even if they do not expect him to become an expert in students' specialisation. In other words, in order to be able to perform fully his task, the ESP professional should be properly trained to undertake his career, take advantage of the professional development opportunities in ESP and rely on the expertise of more experienced colleagues.

#### **4.3.3. In-Service Teacher Education :**

One of the greatest simple obstacles to evaluation from English for general purposes to ESP is in-service teacher education. Coming from a background unrelated to the discipline in which they are asked to teach, the language teachers are usually unable to rely on personal experiences and savoir-faire to cope with the demands made on an ESP practitioner. Consequently, ESP teachers feel at a less and encounter serious attitudinal, conceptual, linguistic, methodological and organizational difficulties.



Besides, they become slaves of the published textbooks and use 'sporadic' materials which are generally quite unsuitable for the target learners.

To get rid of such inconsistencies, it is essential to provide an in-service teacher training for the newly appointed ESP practitioners in order to focus on ESP issues. Such a provision should take place when the person is teaching and may take various forms such as workshops, seminars, short courses, etc. It aims at helping the teachers to have an important knowledge of the language he is teaching namely EST, and more precisely English for Physics, and to learn and master the specific terminology related to this area.

In-service training should also provide assistance and advice regarding ways of describing language, training in language teaching, in designing syllabus and language courses, in the production of materials, and so on. To sum up, guidance on the part of the training teachers is necessary to trainers to carry out the ESP practitioners' required tasks.

Moreover, ESP tutors ignorance of the specialist subject still constitutes a barrier for teaching ESP. This is why subject-specialist's co-operation is a pre-requisite to achieve the effectiveness of the ESP educational programme. Co-operation is one distinguishing characteristic of ESP which may take different forms and rests upon the willingness to co-operate on the part of both sets of staff, i.e. the language teacher and the subject specialist. If this kind of relationship is not forthcoming it would be possible that an approach less related to the content of the learners' area of interest might be adopted.

The subject specialists' help may be demonstrated in the provision of information including the description of the target situation, identification of problem areas and the provision of suitable teaching materials that demonstrate the target uses of the language and cater for learners' needs such as reading lists, recommended books, journals and magazines. The subject teachers may also record talks on audio/video cassettes during scientific meetings. These can be extremely useful for note-taking practice, extensive listening exercises, comprehension exercises and summary writing.

Such a relationship between the language and the subject teachers allows the former to gain adequate knowledge about the specialist subject, to design appropriate courses and to get more confidence when performing his tasks as an ESP practitioner.

Moreover, when co-operation with the subject specialists is not a possibility, the ESP teacher may turn to the students and collaborate more closely with them. As post-graduates, their knowledge of the specialist world is considerably great. Thus, they articulate enough to express their needs, lacks, and wants and are generally highly familiar with the specialist content of materials than the ESP teacher himself.

The ESP teacher may further his in-service education by being in contact with other ESP teachers nationwide. This may be achieved through the organization of meetings and the creation of, or adherence to already existing, national organizations to further the support and development of ESP. These will provide opportunities for ESP

practitioners to meet and discuss any issues and difficulties which may arise in their ESP teaching, either in theory or practice.

ESP teachers' professional development, with all what this implies, are highly recommended and very beneficial for the promotion of ESP. However, such commitments are time consuming and require a great devotion from the part of the persons involved. This is why, the researcher's last recommendation would be to appoint full-time instead of part-time teachers because providing and teaching a scientific content is not enough but much remains to be done to cater for learners' needs and become, therefore, a fully-fledged ESP practitioner.

## **4.4. The Design of Sample Units**

### **4.4.1. Sample Unit Number One : Matter and Volume**

Text :

#### ***Matter and Volume***

***Matter is the name given to everything which has weight and occupies space. It may usually be detected by the senses of touch, sight or smell.***

***Matter may exist in three states : solid, liquid and gas. All substances, except those which decompose when heated, like wood, may be changed from one state into another. A substance in the solid state may be changed into a liquid substance, and one in the liquid state may be changed into a gaseous substance. Changes can take place in the reverse order as well : gases may be changed into liquids and liquids into solids. A solid substance such as ice may be changed into the liquid state, or liquefied, to become water; and this may be changed into the gaseous state, or evaporated, to become steam.***

***Steam may also be converted into water and water into ice. All matter occupies space. The space occupied by a quantity of matter is called its volume, and this is usually measured in units such as cubic metres or cubic centimetres. Solids have a definite volume and shape, liquids have a definite volume but no shape; the latter take on the shape of the container in which they rest. Gases have no definite volume and no shape.***

***The volume of a piece of solid substance, or body, or regular shape, like a cube, a sphere or a cylinder, may be calculated by using mathematical formulae of the following kind :***

***Volume of cube = length  $\times$  breadth  $\times$  height***



*Volume of sphere =  $\frac{4}{3} \pi \times (\text{radius})^3$*

*Volume of cylinder =  $\pi \times (\text{radius})^2 \times \text{height}$*

*The volumes of irregular bodies cannot be calculated by the use of formulae of this kind. They may be measured by means of devices like displacement vessels and measuring jars.*

Adapted from : Allen, J.P.B and Widdowson, H.G.  
English in Physical Science 1974 : 24.

### **Part One : Listening Comprehension**

Exercise One :

3. Which of the following titles do you think fits the text best :
  - a) The states of matter
  - b) Matter and volume
  - c) Matter properties
4. How many paragraphs are there in the text?
5. Now, listen to your teacher and give a title to each paragraph

Exercise Two :

Say whether the following statements are true or false :

- d) Matter can usually be seen, smelt or touched
- e) Matter can be seen, smelt and touched
- f) All substances can be changed from one state into another
- g) A liquid can be changed either into a gas or into a solid
- h) Volume is measured in cubic metres or cubic centimetres
- i) Substances have a definite volume and shape
- j) The volumes of all bodies can be calculated in the same way

Exercise Three :

Complete the following table :

Bodies	Volumes
Cylinder	
	$\frac{4}{3} \pi \times (\text{radius})^3$
Cube	

### Part Two : Reading Comprehension

Exercise One :

Answer the following questions from the text :

- 1) What is matter?
- 2) How can it be detected?
- 3) How do we call the space occupied by a quantity of matter?
- 4) How can the volume of bodies of regular shapes be calculated?

Exercise Two :

Answer the following questions, using your own words :

- 1) What are the different states of matter?
- 2) Gases may be changed into two other states, which are they?
- 3) A solid substance may be subject to two different processes, which are they?
- 4) What is the difference between solids, liquids and gases?

Exercise Three :

Chose the correct statement(s) A, B or C to end each sentence :

- 1) Matter



- a) can be either seen, smelt or touched
  - b) is always seen, smelt and touched
  - c) can be seen, smelt and touched
- 2) Wood
- a) may be changed from one state into another
  - b) is decomposed when heated
  - c) may be liquefied
- 3) Steam may be
- a) changed into a liquid substance
  - b) evaporated
  - c) decomposed when heated
- 4) A cylinder is
- a) an irregular body
  - b) a piece of solid substance
  - c) a piece of regular shape

### Part Three : Word Study

Exercise One :

- 1) What do the following words refer to in the text?
  - 2) Use the words referred to in sentences of your own.
6. 1/ In sentence (2), it refer to :
- a) Weight
  - b) Space
  - c) Matter
7. 2/ In sentence (5), one refers to :
- a) A substance
  - b) A substance in the solid state
  - c) A liquid substance
8. 3/ In sentence (7), this refers to :
- a) A solid substance
  - b) Water
  - c) Ice

9. 4/ In sentence (10), this refers to :

- a) A quantity of matter
- b) Its volume
- c) The space

10. 5/ In sentence (11), the latter refers to :

- a) Solids
- b) Liquids
- c) A definite volume

11. 6/ In sentence (15), they refers to :

- a) Irregular bodies
- b) Formulae
- c) The volume of irregular bodies

Exercise Two :

Find in the text, words which mean the same as the following :

- |              |                 |               |              |
|--------------|-----------------|---------------|--------------|
| 1 – every    | 4 – concept     | 7 – generally | 10 – happen  |
| 2 – measured | 5 – transformed | 8 – stable    | 11 – such as |
| 3 – type     | 6 – are put     | 9 – can       |              |

Exercise Three :

Rewrite the following sentences replacing the words underlined with expressions from the text which have the same meaning :

- 1) A substance in the solid state may be changed into a liquid substance.
- 2) Gases may be changed into liquids and liquids, may be changed into solids.
- 3) A solid may be changed into the liquid state.
- 4) A liquid may be changed into a gas.
- 5) The volume of bodies of regular shape, like cubes, are calculated by using mathematical formulae.
- 6) The volumes of irregular bodies may be measured by means of measuring jars.
- 7) Water may be changed into the gaseous state to become steam.



Exercise Four :

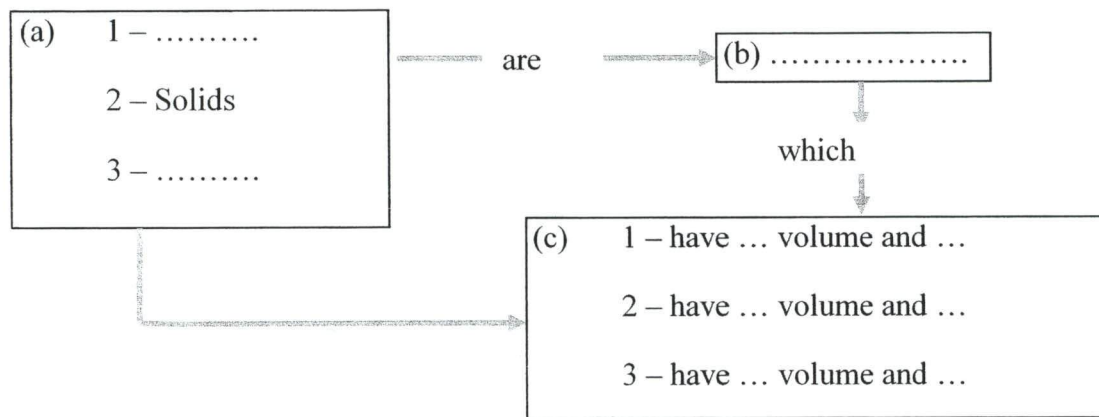
Place the following expressions in the sentences indicated. Replace and reorder the words in the sentences where necessary :

1. can be defined as (1)
2. thus (5)
3. also (6)
4. thus (6)
5. for example (7)
6. then (7)
7. then (9)
8. whereas
9. however

**Part Four : Language use**

Exercise One :

1/ Draw the following diagram and complete it by referring to the reading passage :



2/ Use your completed diagram to :

Write definitions : (a) → (b) → (c)

Write generalizations : (a) → (c)

Example :

Definition : Solids are substances which have a definite volume and a definite shape.

Generalization : Solids have definite volumes and definite shapes.

3/ Definitions in scientific uses of English often take one of the following forms :

Form I: [A] is/are, may be defined as [B] which [C]

Example :

[A - A thermometer] is [B - an instrument] which [C - is used for measuring temperatures]

A thermometer is an instrument used for measuring temperatures

Form II: [B] which [C] is/are called, is/are known as [A]

Example :

[B - An instrument] which [C - is used for measuring temperatures] is called [A - a thermometer]



An instrument which is used for measuring temperatures is called a thermometer

Use the information in the diagram above to write out as many definitions as you can, using form I : (a)  $\rightarrow$  (b)  $\rightarrow$  (c) and form II : (b)  $\rightarrow$  (c)  $\rightarrow$  (a)

4/ The same generalization may be expressed in more than one way :

Example :

- (a) Solids have a definite volume and a definite shape.
- = (b) A solid has a definite volume and a definite shape.
- = (c) All solids have a definite volume and a definite shape.

Express the generalizations you have written out in (2  $\rightarrow$  ii) above, in different ways.

Exercise Two :

Consider the following statements :

All substances, except those which decompose when heated, can be changed from one state to another

A solid substance can be changed into a liquid substance.

Statement (B) follows logically from statement (A). If (A) is true then (B) must also be true.

Both statements are generalizations, but (A) is a higher level generalization than (B)

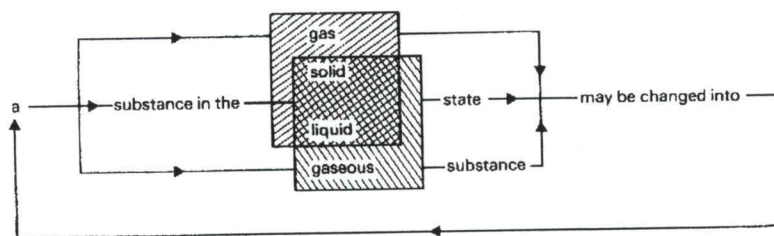
1/ Use the following diagram to write out as many lower level generalizations like statement (B) as you can.

Examples :

A solid may be changed into a substance in the liquid state.

A substance in the solid state may be changed into a liquid.

A gaseous substance may be changed into a liquid substance.



2/ Express these generalizations in the different ways shown in exercise one, part (4) above.

Exercise three :

Expand the following into full definitions. Write each sentence four times, using each of the patterns illustrated in the examples given in exercise one, part (3)

1 – metamorphosis / the physical transformation / is undergone by various animals during development after the embryonic stage

2 – metals / the class of chemical elements / are characterized by ductility, malleability, lustre and conductivity

3 – a spectrum / the band of colours / can be formed by dispersing the light in a beam of mixed colours

4 – an electromagnet / a soft iron core / temporarily becomes a magnet when an electric current flows through a coil of wire surrounding it

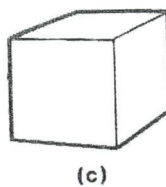
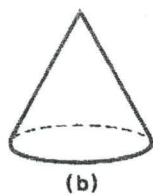
5 – a chloride ion / an atom of chloride / has gained an electron and so become negatively charged

Exercise Four :

1/ Draw the table below and arrange the following information in it

a – Regular bodies : cube – cylinder – cone – sphere

b – Shapes





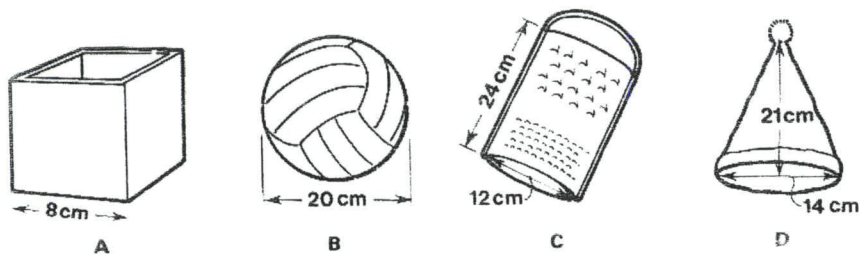
c – Volumes :  $l \times (\text{length}) \times b$  (breadth)  $\times h$  (height);  $\frac{4}{3} \pi \times r^3$ ;  $\pi r^2 \times h$ ;  $\frac{\pi r^2 \times h}{3}$  ( $\pi = 3.14$ )

Body	Shape	Volume
cube		$l \times b \times h$

2/ Make statements about the objects illustrated below by using the following terms :

Cube  $\leftrightarrow$  cubical ; cone  $\leftrightarrow$  conical

Sphere  $\leftrightarrow$  spherical ; cylinder  $\leftrightarrow$  cylindrical



Examples :

Object A is a cube

Object A is on the shape of a cube

Object A is cubical

Object A is cubical in shape

it volume is ... cm<sup>3</sup> or ... m<sup>3</sup>

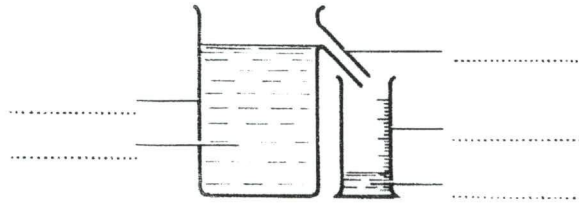
Exercise Five :

Read this description of an experiment :

The measurement of the volume of irregular solids :

Water is poured into the displacement vessel until it overflows through the pipe into the measuring jar. The level of the water surface in the measuring jar is read, and then the solid is lowered into the vessel until it is completely covered by the water. Water is displaced and flows down the pipe into the measuring jar, and the level of the water surface in the measuring jar is read again. The volume of water displaced is equal to the volume of the body.

1/ Draw the diagram below and label it. Then draw a second diagram to illustrate the measurement of the volume of irregular solids described above.



2/ Change the description of measurement given into a set of directions, etc, for measuring the volume of irregular solids by using the following framework.

A – Directions :

Take a displacement vessel and a measuring jar.

.....  
 .....  
 .....

Statement of result :

Water is displaced and flows down the pipe into the measuring jar.

B – Direction :

.....

Statement of result :

The volume of water displaced is equal to the volume of the body.

### Part Five : Structure Study

Exercise One :

Look at the following sentences :

a – The light is deflected

b – The deflection depends on the angle of inclination

These can be combined into one sentence :

c – The light is deflected, the deflection depending on the angle inclination

Notice what changes are made :



The light is deflected. The deflection depends on the angle of inclination.



The light is deflected, the deflection depending on the angle of inclination.

Combine each of the following pairs of sentence by using “ – ing clause” in the same way

1 – Two rod, of metal and wood respectively, are joined end in a straight line. The wooden end of the composite rod projects at right angles over the edge of the table.

2 – In petrol engines, the power is produced by the expansion of gases in a cylinder by heating. The fuel for combustion is a mixture of petrol vapour and air.

3 – The process continues until the temperature is lowered sufficiently for liquid air to be produced. The liquid air is collected in a vacuum flask.

4 – The hot gas passes into a condenser where it is cooled and condensed to liquid ammonia. The high pressure in the apparatus helps in this process.

5 – Heat and light energy are propagated by traverse waves. The commonest example of such is found in water.

6 – If a belt or chain connects wheels of different diameters, the number of revolutions of these wheels will not be the same in a given time. The smaller wheels make the greater number of revolutions.

Exercise Two :

Look at the following sentences :

- a) Machines must be provided with a protective casing
- b) Machines are dangerous

If the noun phrases “machines” refers to the same thing in both sentences, we can combine the two sentences into one :

- c) Machines which are dangerous must be provided with a protective casing.

Now compare the following sentences :

- d) The machine which is dangerous must be provided with a protective casing.
- e) The machine, which is dangerous, must be provided with a protective casing.

In sentence (d), the clause “which is dangerous” tells us what kind of machine we are talking about.

It is a defining relative clause.

In sentence (e), the clause “, which is dangerous,” tells us something extra about the machine we are talking about. It is a non-defining relative clause. Note the use of commas.

Combine each of the following pairs of sentences into a single sentence. Make the second sentence into a relative clause and insert it into the first sentence at the place marked by dots. Note whether the relative clause is a defining or a non-defining one.

Exercise Three :

A-Look at the following example :

Zinc oxide is a white powder ... The powder becomes yellow when it is heated.

Zinc oxide is a white powder which becomes yellow when it is heated. (defining).

1 – Conductors of this second class, ..., are called electrolytes, they are decomposed when an electric current passes.

2 – Much scientific information can be summarized statements ... The statements are known as scientific laws.

3 – The figure indicates one molecule of sulphuric acid ..., but remember that there would be millions of such molecules in the solution. One molecule of sulphuric acid has not broken up.

4 – The single conductor ... will also be found to be positively charged. The conductor was touched before the ebonite rod was removed.

5 – The experiment illustrates the fact that there is something which might be described as “electrical pressure”, ... “Electrical pressure” decides the movement of electrical charges. (There are two relative clauses in this sentence. Underlined them and say which clause is defining and which is non-defining?)

B-Turn each of the sentences into the negative then the interrogative form.

### Part Six : Writing

Exercise One :

Punctuate the following paragraph. Use capital letters where necessary :

Magnetize a piece of clock spring or a hacksaw blade about 25cm long by stroking it with a magnet test the magnet you have made with a compass to be sure that it has a north pole at on end and a south pole at the other mark the poles n and s with chalk does



the compass show any polarity at the centre of the magnet use a pair of pliers and break the long magnet into two parts each about 12.5cm long test the polarity of each end of the two magnets what do you observe mark the poles of each magnet n and s now break the two magnets into four magnets test each end and mark them as n and s continue deviding the magnets as many times as you can what does this experiment suggest

#### Exercise Two :

Carry out the following experiment, and then write reports of them. Illustrate your reports with diagrams where you think this is necessary.

1/ Remove the brass shell from a used electric bulb by gently heating it in a gas or alcohol flame. When the sealing wax begins to smoke, grasp the sell with a pair of pliers and twist it away from the glass bulb. Observe the end of the sealed tube, extending from the bulb through which the air is removed. Place the bulb, tube end down, in a far of coloured water. With a pair of pliers, snip the end of the tube (while under water). What happens? How do you explain this?

2/ Place manganese (IV) oxide powder in a flask and fit a thistle funnel and a delivery tube into the stopper of the flask. Place the end of the delivery tube in a through containing brine and place a jar containing a column of brine upside down in the through, supported by a shelf, so that the end of the delivery tube is beneath the open end of the jar. Drop concentrated hydrochloric acid or to the manganese (IV) oxide through the thistle funnel and heat the flask. What happens.

#### Part Seven : Free Reading

1/ Read the following passage in your own time. Try to find additional examples of the points you have studied in this unit.

*A heavy body, such as a large rock, can be raised easily when it is under water, but seems to be much heavier as soon as it comes out into the air. The apparent loss of weight when a body is placed in liquid may be demonstrated as follows. Hang a stone from a spring balance by means of a thread and gradually lower the stone into a vessel containing water. As soon as the stone touches the water the spring balance reading is reduced, showing that the water exerts an upthrust on the stone. The spring balance reading will continue to get smaller as more of the stone enters the water, until the stone is completely immersed. There will be no change in the reading as the stone is lowered to a greater depth. If the stone is then gradually withdraw from the water, the changes in the balance reading will be reversed. These facts were accounted for by the greck philosopher Archimedes, who stated that the apparent loss of weight of a body when it is immersed in a liquid is equal to the weight of liquid displaced. There are several simple but important applications of this principle. For example, if we want to find the volume of an irregular solid or may weigh the solid hanging in air and then reweigh it hanging in water. Suppose we find that the apparent loss of weight is 3g.*

Then the water displaced has a mass of 3g. and therefore has a volume of 3cm<sup>3</sup>, which must be the volume of the solid.

To find the relative density of a solid, first weigh a piece of the solid in air and then in water as described above. Let the two weighs be  $W$  and  $w$  respectively. Relative density is equal to the weight of the solid divided by the weight of the same volume of water. However, by the principle of Archimedes the weight of the same volume of water is equal to the apparent loss of weight. Therefore, the relative density of the solid is equal

to the weight of the solid divided by the apparent loss of weight, ie  $\frac{W}{W - w}$ .

Adapted from : Allen, J.P.B AND Widdowson, H.G.  
English in Physical Science 1974 : 36 - 37.

2/ Read the passage carefully then write answers to the following questions :

- 1 – What happens when a stone is suspended from a spring balance and gradually lowered into water?
- 2 – What happens when the stone is withdrawn from the water?
- 3 – What was the principle stated by Archimedes?
- 4 – How do we find the volume of an irregular solid?
- 5 – A piece of metal is weighed in water and in air. Weight of metal in air = 20.23g; apparent weight of metal in water = 17.34g. What is the relative density of the metal?

#### **4.4.2-Sample Unit Number Two**

Text :

*Electrically Active Defects in Silicon after Various Optical Thermal Processing*

*Abstract*

*Schottky diodes have been made on virgin n-type monocrystalline silicon annealed by various optical thermal processes including lasers and incoherent light heat-pulses. The electrical characteristics of the diodes have been measured as a function of the laser energy density. A strong change in all their electrical parameters occurs for energy density equal or higher than a fluence threshold at which the processed silicon surface layer turns into melt. Capacitance measurements and DLTS analyses show that laser irradiations introduce a large density of deep levels related to donor defects in the processed surface region. DLTS analyses performed on samples processed with incoherent light heat-pulses show that deep levels related to majority carrier trap defects are also generated by this new thermal process. The results have been compared to those obtained from parallel analyses carried out on p-type silicon processed using either rapid or conventional thermal annealing mode.*

##### **1. INTRODUCTION**



Optical Thermal Processes (OTP) can offer many advantages in a strategy focused on cost-effective techniques for the preparation of electronic devices, especially solar cells, in an automatic and continuous way. There exist several OTP which operate either in an adiabatic regime with coherent light (Lasers) or in an isothermal short duration regime with incoherent light (Rapid Isothermal Processes). These optical heating techniques are advantageous because they are fast and clean as only the sample is heated and not the reactor. Moreover, the lamp furnace annealing, which is presently as fashionable annealing mode, offers some attractive features such as low time and power consumption and hence a minimum overall thermal budget. However, despite this great interest, one of the major obstacles to the development of OTP for large practical and industrial applications is the fact that they induce an important concentration of electrically active defects in the processed samples. These defects were thought to be frozen-in during the rapid quenching procedure characterising OTP.

In this paper we report some experimental results obtained on OTP-induced defects in silicon material used in the technology of solar cells. Three different OTP including two solid-state pulsed lasers and an incoherent light pulse heating technique have been considered. We examine their effects on the electrical properties of silicon Schottky diodes. Some of the observed effects are compared to those resulting from the conventional annealing treatments.

## 2. EXPERIMENTAL PROCEDURE

The investigations were carried out on virgin n-type phosphorus-doped  $\langle 100 \rangle$  oriented float-zone growth (FZ) monocrystalline silicon of 1-5  $\Omega\text{cm}$  resistivity. The samples were first degreased in boiling trichlorethylene for 5 min., cleaned in acetone, rinsed in running demineralised water and dried with flowing nitrogen gas. After, they were chemically polished in CP4 etching mixture for 2 min., carefully rinsed again in running demineralised water and finally dried under nitrogen gas flux to be ready for the optical thermal treatments. These were performed, immediately after chemical preparation of the samples, in three different manners :

By a Q-switched solid-state pulsed Ruby laser ( $\lambda = 694.3 \text{ nm}$ ), operating in the monomode released working regime, giving a single spot of about 9 mm in diameter and pulses of 20 ns duration. The beam energy density  $E$  ranged from 0.6 to 1.2  $\text{J/cm}^2$ .

By a Q-switched solid-state pulsed Nd-YAG laser, operating at 530 nm wavelength. This laser delivers pulses of about 100 ns duration and a small spot diameter (typically 0.1 mm) but at a very high repetitive rate, up to 10 kHz. Large areas are covered in this case by scanning the pulsed beam under controlled over lapping conditions. The beam energy density  $E$  has been varied from 0.6 to 1.3  $\text{J/cm}^2$ .

By a large-area incoherent lamps heat source proved to be one of the most reliable rapid thermal annealing (RTA) techniques reducing the thermal budget in electronic device processing. RTA isothermal treatments were carried out in a flowing argon gas ambient, for 10 s, at temperature ranging from 450°C to 850°C in steps of 200°C, using a commercial FAV4 model from JIPELEC (France) heat pulse lamp furnace. In this System the heating is produced by a ramp of quartz halogen lamps. A typical time temperature profile is composed of a rise time of about 5 s, a period of few seconds at



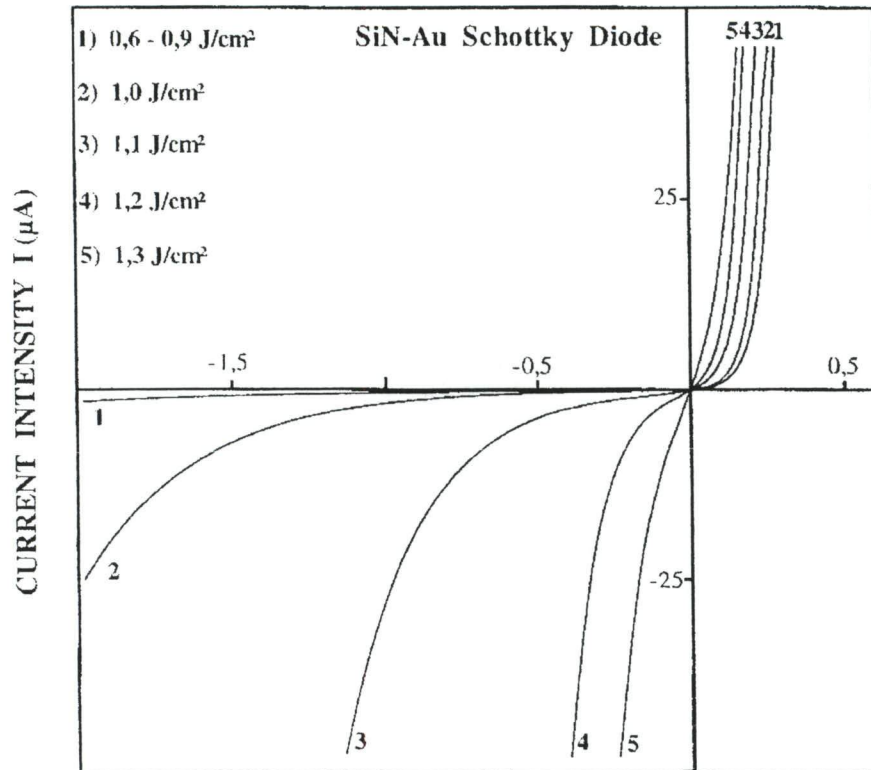
maximum temperature, and subsequent natural ramping down at the end of the cycle with cooling rate typically around  $100^{\circ}\text{C.s}^{-1}$ . In this study, the light irradiations were performed by heating and cooling stages similar to those used in conventional furnace treatments so as to allow for a comparison with our previous results. Some parallel light irradiations have also been performed on virgin p-type boron-doped  $\langle 001 \rangle$  oriented Czochralski pulled (CZ) monocrystalline silicon of  $20 \Omega\text{cm}$  resistivity, to look at the influence of the starting wafer on the obtained results.

To analyse the samples, four Schottky diodes were realised on each one of them. Next, current-voltage (I-V) and capacitance-voltage (C-V) characteristics of the diodes have been measured and their most important electrical parameters have been deduced. The induced electrically active defects generated in the bulk of the samples were investigated by DLTS.

### 3. EXPERIMENTAL RESULTS AND DISCUSSION

#### 3.1. Devices processed with pulsed laser

I-V characteristics of Schottky diodes made on Nd-YAG laser processed samples have been recorded as a function of the beam energy density  $E$  (figure 1). Schottky diodes made on reference unirradiated samples exhibit good and reproducible rectifier electrical characteristics. For low energy densities ( $E \leq 0.9 \text{ J/cm}^2$ ), the I-V behaviour of a reference device remains well preserved. The rectifier effect disappears at nearly  $E = 1 \text{ J/cm}^2$ . With increasing energy density up to this value, a drastic degradation occurs and the I-V curves become no longer rectifying indicating the formation of a quasi-ohmic contact. It can be noticed that I-V measurements performed at 77 K do not show the same experimental results. Indeed, for  $1.3 \text{ J/cm}^2$  irradiated sample for example, I-V curves show a quasi-ohmic behaviour at 300 K, but at 77 K they are very close to that of the reference Schottky diode.



POLARISATION VOLTAGE  $V$  (Volt)

Fig. 1 : Evolution of the I-V electrical characteristics of Au-Si Schottky diodes as a function of pulsed Nd-YAG laser energy density. A strong electrical degradation in I-V curves occurs at  $\sim 1\text{J}/\text{cm}^2$  threshold.

Figure 2 shows the evolution of the potential barrier height  $V_{bn}$  with the beam energy density  $E$  of Nd-YAG laser.  $V_{bn}$  has been calculated from the forward saturation current of Schottky diodes by assuming a pure thermoionic transport. Starting from a typical value of  $0.75\text{ V}$  for the reference diode,  $V_{bn}$  remains practically constant for the lower energy densities ( $E \leq 0.9\text{ J}/\text{cm}^2$ ). With increasing  $E$ ,  $V_{bn}$  decreases slightly after  $1\text{ J}/\text{cm}^2$  and goes down continuously to reach very low values ( $< 0.6\text{ V}$ ) for the higher energy densities.



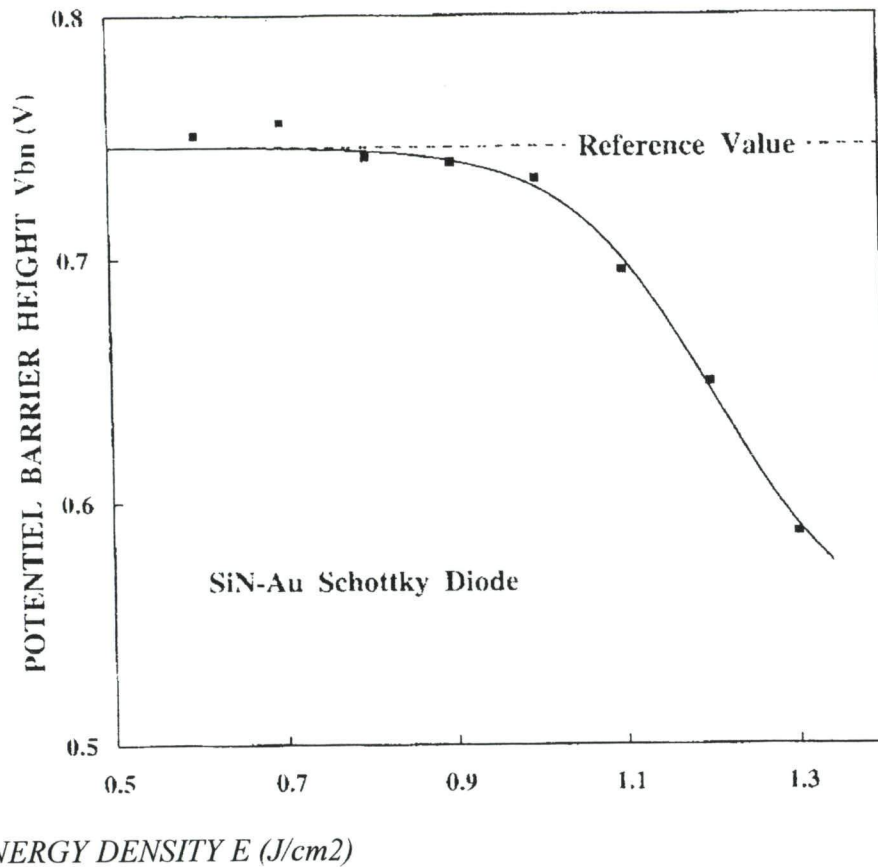


Fig. 2 : Evolution of the potential barrier height  $V_{bn}$  of Au-Si(N) Schottky diodes as a function of pulsed Nd-YAG laser energy density. A strong electrical degradation in  $V_{bn}$  occurs at  $\sim 1$  J/cm<sup>2</sup> threshold.

The change in the diode quality factor  $n$  as a function of Nd-YAG laser energy density is reported in Figure 3. Starting from a typical 1.15 value for the reference Schottky diode,  $n$  remains practically unchanged for the lower energy densities. At nearly  $E = 1$  J/cm<sup>2</sup>,  $n$  shows a small increase and then goes up continuously to reach values higher than 3 for  $E > 1.3$  J/cm<sup>2</sup>.

Capacitance-Voltage measurements have been carried out at 1 MHz frequency. Figure 4 shows the evolution of the measured diode capacity value at  $-0.5$  V with the beam energy density  $E$  of Nd-YAG laser. Lower energy densities induce practically no change in the capacity value. Following irradiation at  $E = 1$  J/cm<sup>2</sup> the capacity value starts increasing significantly and quickly becomes very high for the higher energy densities indicating an increased concentration of ionised donor centres close to the surface of the sample.

From the above results, we notice practically the same energy density threshold around 1 J/cm<sup>2</sup> for which all the electrical properties of the diodes start to degrade. Indeed, for a beam energy density lower than 1 J/cm<sup>2</sup>, Nd-YAG laser produces only very small changes in the diode electrical parameters.

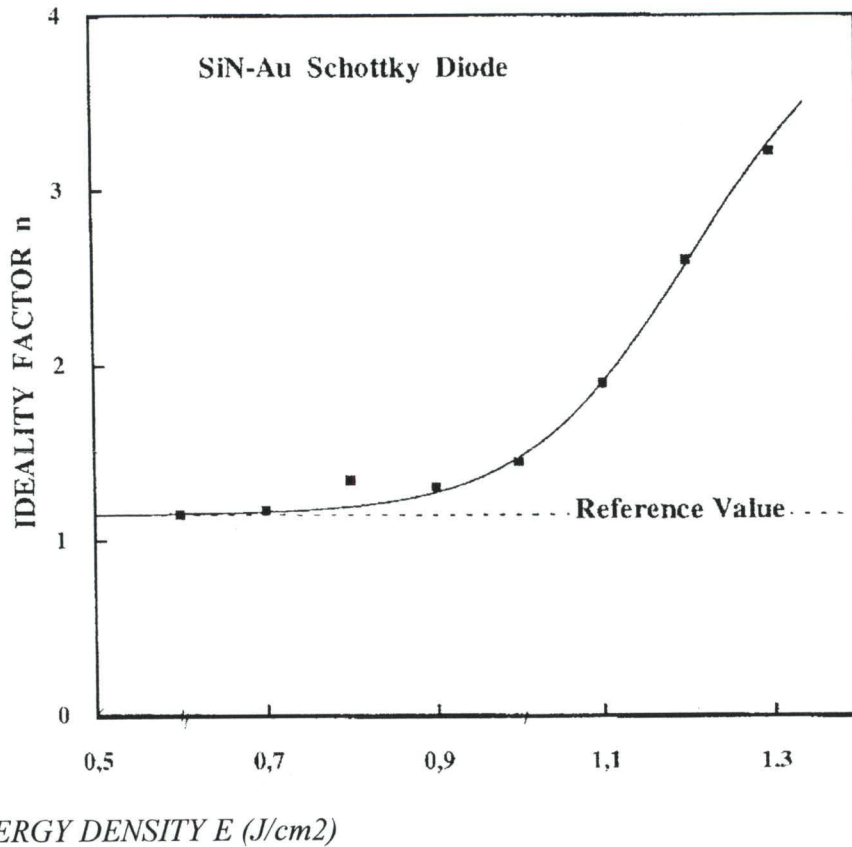


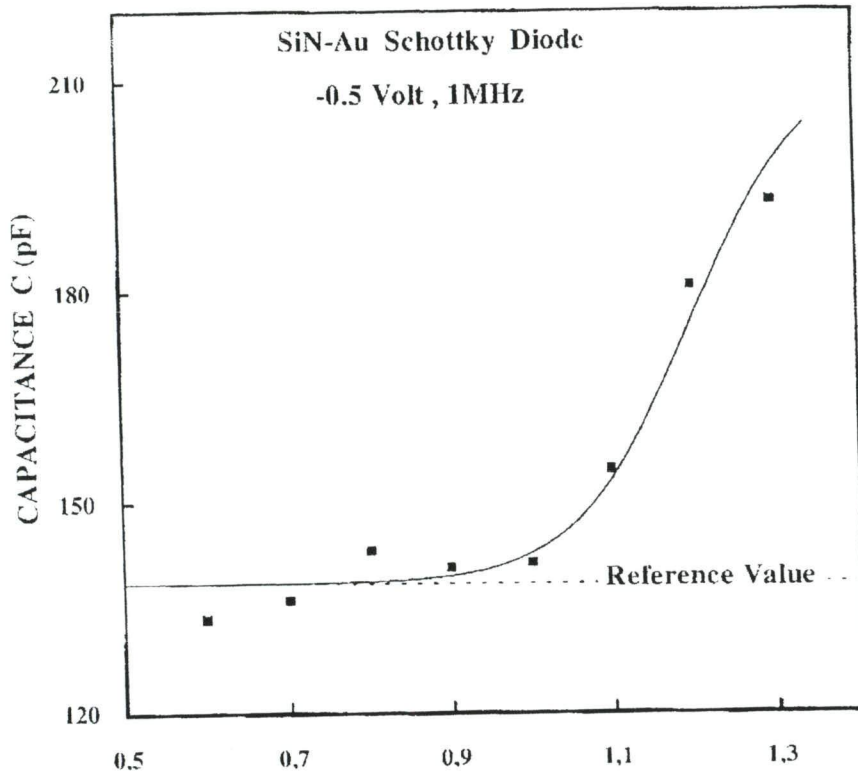
Fig. 3 : Evolution of the ideality factor  $n$  of Au-Si (N) Schottky diodes as a function of pulsed Nd-YAG laser energy density. A strong electrical degradation in  $n$  occurs at  $\sim 1$  J/cm<sup>2</sup> threshold.

However, above this threshold a fast degradation occurs and all of the diode electrical properties indicate practically the same behaviour and the coherent trends. The sharp increase of the capacity value measured at  $-0.5$  V as well as the great difference observed between the I-V curves recorded at 77 K and at 300 K indicate that high concentration of donor centres are induced by laser irradiations in the vicinity of the processed sample surfaces. Computer simulation through our model calculation have shown that, for energy density around or higher than 1 J/cm<sup>2</sup>, the silicon surface processed layer turns into melt. So, we think that the most damaging defects responsible for the diode degradation are generated in the laser induced molten layer and we believe that they result from the quenching process due to the fast melt cooling and solidification rate.

The experimental procedure and study described above has been entirely and systematically carried out again in exactly the same experimental conditions but Nd-YAG laser has been substituted for pulsed Ruby one. The energy density threshold, for which a significant degradation in Schottky diode electrical characteristics and properties occurs, was about 0.7 – 0.8 J/cm<sup>2</sup>. This degradation threshold coincide also with the beam energy density value for which the surface processed layer of the silicon sample turns into melt.



Figure 5 shows a typical DLTS spectrum from a Ruby laser-irradiated sample at  $1 \text{ J/cm}^2$  beam energy density, which is higher than the melting and electrical degradation energy threshold.



ENERGY DENSITY E (J/cm<sup>2</sup>)

Fig. 4 : Evolution of the capacitance  $C$  measured at  $-0.5 \text{ V}$  of Au-Si(N) Schottky diodes as a function of pulsed Nd-YAG laser energy density. A strong increase in  $C$  ( $-0.5 \text{ V}$ ) value occurs at  $\sim 1 \text{ J/cm}^2$  threshold.

The spectrum exhibits three main peaks labelled E1, E2 and E3 due to electron traps located respectively at  $0.32 \text{ eV}$ ,  $0.43 \text{ eV}$  and  $0.58 \text{ eV}$  below the conduction band. The corresponding capture cross sections of the traps are  $4.4 \cdot 10^{-16} \text{ cm}^2$ ,  $1.4 \cdot 10^{-16} \text{ cm}^2$  and  $5 \cdot 10^{-15} \text{ cm}^2$  respectively. The dominant defect peak in the spectrum, i.e., the  $E_c-0.32 \text{ eV}$  trap, gave a concentration of about  $6 \cdot 10^{14} \text{ cm}^{-3}$  at  $-1 \text{ V}$  reverse bias and  $50 \text{ s}^{-1}$  emission rate.

These same deep levels have been seen also in samples irradiated with pulsed Nd-YAG laser at  $1.6 \text{ J/cm}^2$  energy density, which is well above the melting and electrical degradation threshold. Considering the fact that the melt depths induced in the silicon wafers by the two lasers at their corresponding energies ( $1 \text{ J/cm}^2$  for Ruby and  $1.6 \text{ J/cm}^2$  for Nd-YAG) are approximately equal ( $\sim 500 \text{ \AA}$ ), it is not surprising that the same levels are observed here. This suggests that the essential parameters in defect formation during liquid-phase processing are the melt depth and the velocity of solidification or melt cooling rate. A situation in which melt depths are equal and natural cooling is employed produces the same defects irrespective of the type of laser used. The defect

states produced are characteristics of pulsed laser-treated silicon, and much tentative identification has been proposed. In our previous works, we have showed that these defects can be electrically neutralised either by low-energy hydrogen ion implantation or by rapid thermal annealing at 600°C for 60 s duration.

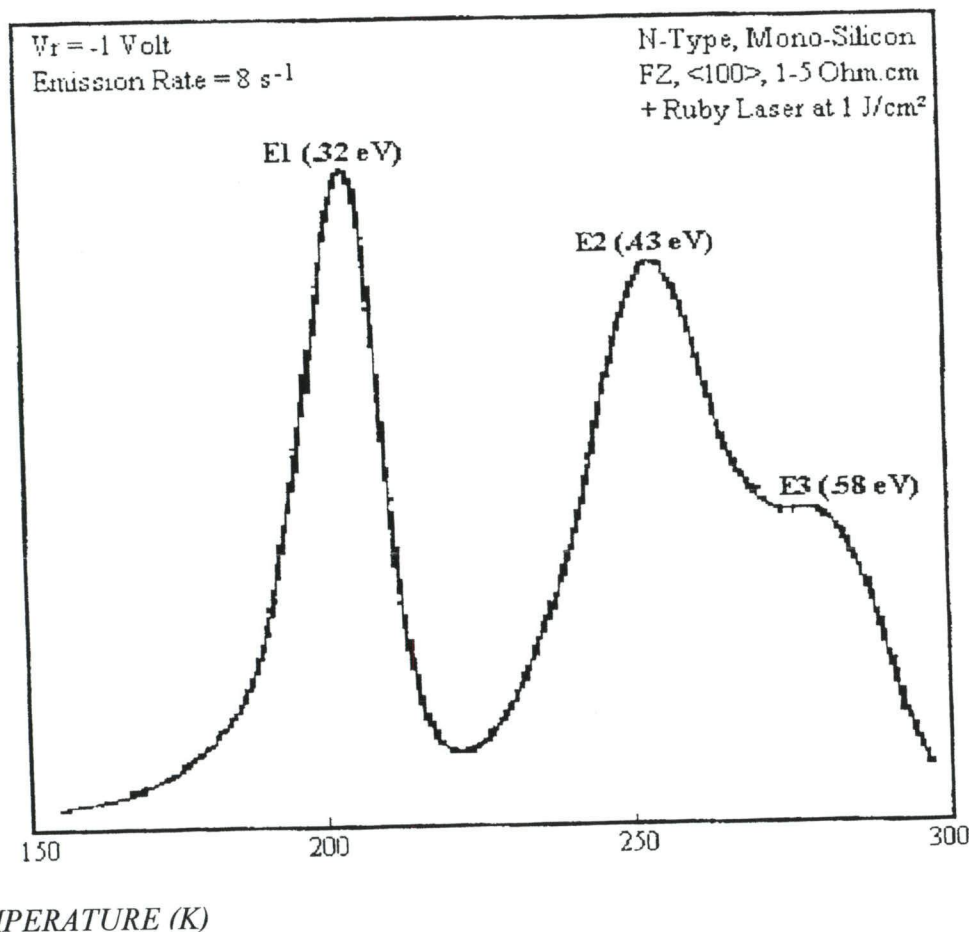


Fig. 5 : D.L.T.S. spectrum from Au-Si(N) Schottky diodes after pulsed Ruby laser at  $1 \text{ J/cm}^2$  beam energy density which is higher than the melting energy threshold. The spectrum exhibits three main peaks labelled E1, E2 and E3 due to electron traps located respectively at 0.32 eV, 0.43 eV and 0.58 eV below the conduction band.

### 3.2. Devices processed with fast thermal annealing technique

Figure 6 shows the evolution of DLTS spectrum obtained on n-type silicon samples processed in the rapid thermal furnace as a function of the annealing temperature. Curves 1 and 2 indicate that no DLTS peaks are detected in the samples processed at 450°C or 650°C respectively. However, at 850°C we observe a well resolved peak (curve 3) which is associated to an electron trap deep level located at  $E_c - 0.21 \text{ eV}$  with an effective cross section in the order of  $E-17 \text{ cm}^2$ . The same level has been also seen, with lower concentration, in n-type silicon samples processed for 30 min. at 850°C in the classical thermal furnace. The origin of this level still not clarified but, considering the experimental conditions by which it appears, we believe that external contamination is mostly responsible for its generation.



Figure 7 shows a typical DLTS spectrum from Schottky diodes realised on rapid thermal processed p-type silicon samples. At least four hole trap peaks label led H1 to H4 can be resolved. The energies of the corresponding four deep levels are respectively 0.18 eV, 0.22 eV, 0.33 eV and 0.43 eV above the valence band. The dominant peak in the spectrum, i.e., the  $E_v+0.43$  eV level acts as recombination centre.

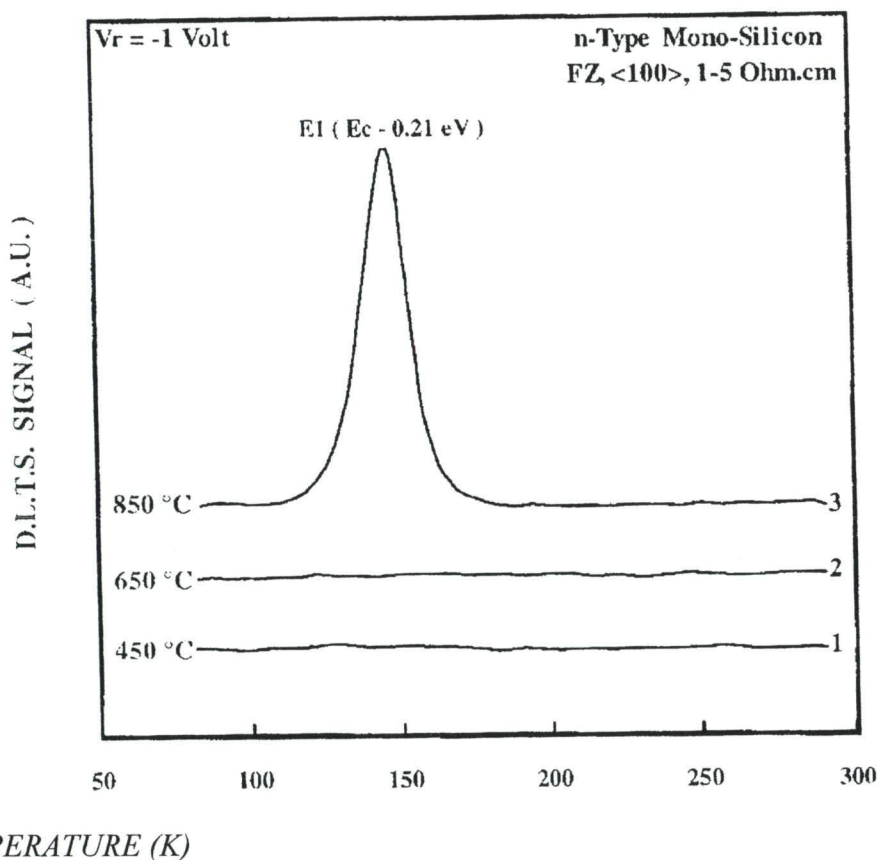
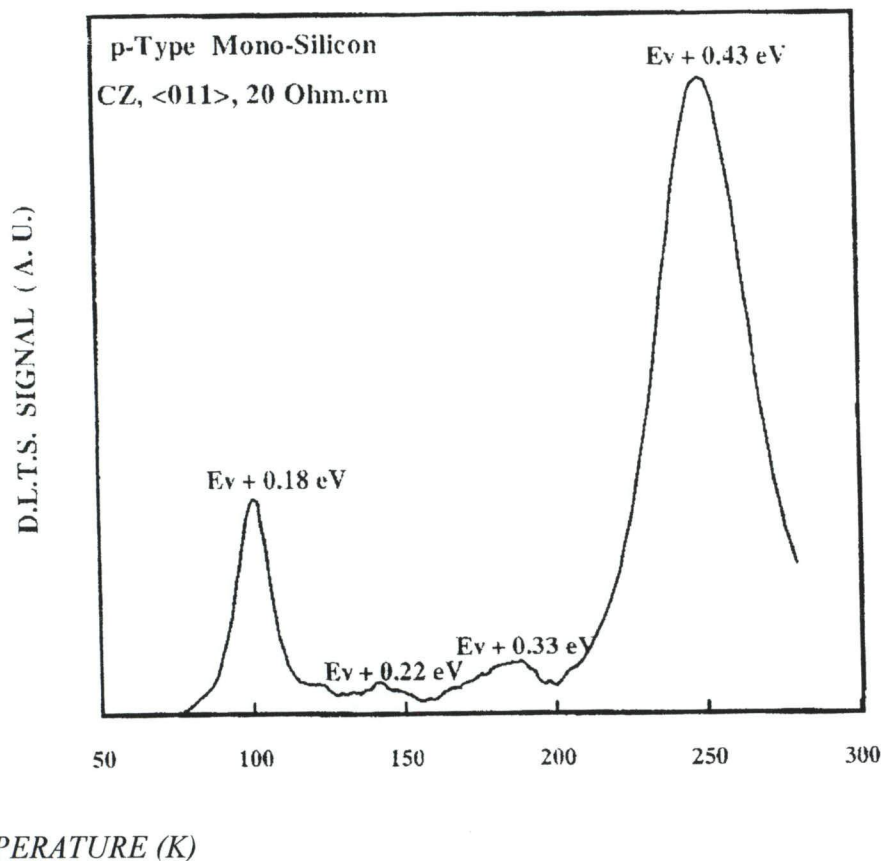


Fig. 6 : D.L.T.S. spectrums from Au-Si(N) Schottky diodes after incoherent light thermal processing at different temperatures. The thermal processings have been performed under Argon atmosphere, for 10 s in Rapid Thermal Annealing Furnace.

It has previously been observed by many other authors and attributed to interstitial iron atoms ( $Fe_i$ ) resulting from the dissociation of Fe-B pairs existing at great concentration in as-grown Czochralski-pulled p-type silicon ingots. We cannot exclude the formation of complexes between vacancies created by nonequilibrium conditions during fast thermal processing and impurities such as heavy metallic atoms or oxygen and carbon which are often present at high level of concentration in CZ grown silicon. So, from these considerations, the deep level located at  $E_v+0.33$  eV may be attributed to Fe-0 complex. In the same way, the two other deep levels H1 and H2 are most probably connected with interstitial oxygen-vacancy ( $O_i - V$ ) complex and bivacancy defect respectively. Precise identification of the nature of the defects or complexes corresponding to the observed deep levels will require further investigations.

#### 4. CONCLUSION

*In summary, this work has clearly demonstrated that pulsed Nd-YAG laser-related defects are almost identical to those generated by the other solid-state pulsed Ruby laser. The electrically active defects induced by these two lasers working in the liquid-phase regime seem to be solely due to the regrowth velocity as was speculated in the past. A post-laser hydrogen ion implantation for less than one minute or a thermal treatment with incoherent light pulse technique around 600°C for one minute allow all of these defects to anneal out. From these results it is clear that, for example, the combination of a pulsed laser for electronic device processing and of rapid thermal annealing for residual defect removing may lead to better device performance, and certainly provides a considerable reduction in processing time. Obviously, rapid thermal annealing must be done at temperatures lower than 800°C else other electrically active defects will be produced.*



*Fig. 7 : D.L.T.S. spectrum from Al-Si(P) Schottky diodes after incoherent light thermal processing at 850°C, for 10 s, under Argon atmosphere, in Rapid Thermal Annealing Furnace.*

From : Renewable Energies Magazine( 2004)  
V ol.3, N°1 : 29-38.

### Part One : Listening Comprehension

Before giving the text to the students, the teacher asks them to listen to him reading the introduction in order to do the following exercise :



## Exercise One :

Say whether the following statements are true (T) or false (F). Correct the false sentences:

- 1) OTP operates in three distinct ways.
- 2) Solar cells are a kind of Optical Thermal Processes.
- 3) Lasers are OTP that operate in an isothermal short duration regime.
- 4) The OTP have many defects.

## Exercise Two :

The teacher reads the introduction once again so that the students answer the following questions :

- 1) How do the different OTP can operate?
- 2) What are the advantages of the OTP?
- 3) What is the greatest obstacle for the use of OTP for large practical and industrial applications?

**Part Two : Reading Comprehension**

The teacher gives the text to students, reads it again, then asks them to do the exercises below:

## Exercise One :

Read the text several times, then answer the following questions using your own words :

- 1) What is the text about?
- 2) What are the different parts of the text?
- 3) What is the role of each part?
- 4) What is the nature of the text studied?  
Please, justify your answer.

Exercise Two :

Read the text again then answer the following questions from the text :

- 1) On what were the investigations carried out?
- 2) How were the samples chemically prepared before the optical thermal treatments?
- 3) What do figure (2) represent?
- 4) What is the difference between figure (3) and figure (4)?
- 5) Is it possible to exclude the formation of complexes between vacancies created by nonequilibrium conditions?

Exercise Three :

Derive your own conclusion from the different experiments undertaken?

### **Part Three : Word Study**

Exercise One :

What are the words in the text for which the following synonyms could be substituted?

- |             |             |              |
|-------------|-------------|--------------|
| 1- Several  | 4- Impacts  | 7- Outcomes  |
| 2- Similar  | 5- Increase | 8- Speed     |
| 3- Distinct | 6- Stands   | 9- Beginning |

Use each of the first five synonyms in sentences of your own.

Exercise Two :

Find in the text words which mean the opposite of the following :

- |                    |              |             |
|--------------------|--------------|-------------|
| 1- Disadvantageous | 4- Ammonised | 7- Higher   |
| 2- Adiabatique     | 5- Induced   | 8- Slow     |
| 3- Decreasing      | 6- Radiated  | 9- Coherent |

Use each of the last five opposites in sentences of your own.



Exercise Three :

A/ Look at the following examples:

- 1) Capacitance measurement and DLTS analysis show that laser irradiations introduce a large density of deep structures

Measurement            —————>    to measure

Analysis                —————>    to analyse

Irradiation             —————>    to irradiate

- 2) There exist several OTP which operate either in an adiabatic regime or in an isothermal short duration regime

To exist                 —————>    an existence

To operate              —————>    an operation

B/ Now, complete the following table :

<i>Verb</i>	<i>Noun</i>
To interest	Consumption
To induce	Development Application
To characterize	Concentration
To report	
To use	Treatment Procedure
To release	
To investigate	Reduction

C/ Use either the verbs or the nouns in sentences of your own.

Exercise Four :

A/ Examine the following examples :

1) A fast degradation occurs  
 Adjective Noun Verb

2) These were performed after chemical preparation of the samples  
 Verb Adverb Adjective Noun

B/ Complete the table below by putting each of the following words in the appropriate column:

Electrical – a function – indicate – above – incoherent – entirely – describe – various – strong – moreover – fast – hence – offer – obstacles – however – under – important – before – deduced – remains – lower – densities – energy.

Verb	Nouns	Adjectives	Adverbs

#### Part Four : Structure Study

Exercise One :

A/ Look at the following statements :

- a) The electrical characteristics of the diodes have been measured by the scientist as a function of the laser energy density → the passive voice.
- b) The electrical characteristics of the diodes have been measured as a function of the laser energy density → the impersonal passive.
- c) The scientist has measured the electrical characteristics of the diodes as a function of the laser energy density → the passive voice.

B/ On the basis of the above examples, turn the following statements either into the active voice or the passive voice :

- 1) A typical time temperature profile is composed of a rise time of about five seconds.
- 2) There was a chemical preparation of the samples.
- 3) Deep levels related to majority carrier trap defects are generated by this new thermal process.
- 4) The C-V characteristics of the diodes have been measured and the most important electrical parameters have been deduced.
- 5) Four Schottky diodes were realized on each of the samples to analyse them.
- 6) There has been the record of the laser processed samples as a function of the beam energy density.
- 7) The change in the diode quality factor  $n$  as a function of the Nd-YAG laser energy density is reported in figure (3).
- 8) All the diode electrical properties indicate practically the same behaviour

Exercise Two :

A/ Note the following patterns :

- a) If OTP are used for large practical and industrial applications, they will induce an important concentration of electrically active defects.

If + present tenses —————> future tense

- b) If OTP were used for large practical and industrial applications, they could induce an important concentration of electrically active defects.

If + past tenses —————> conditional

B/ Put the verbs between brackets in the correct form :

- 1) If a Nd-YAG laser operates at 530 nm wavelength, it (to deliver) pulses of about 100 ns duration.
- 2) If a large area incoherent lamps heat source was used, the thermal budget in electronic device (to reduce).
- 3) It (to be possible) to compare the results if the light irradiations were performed under the same conditions used in conventional furnace treatments.
- 4) If Schottky diodes have been made on reference unirradiated samples, they (to exhibit) reproducible rectifier electrical characteristics.
- 5) If I-V measurements (to perform), they (do not show) the same experimental results.



**Part Five : Language Use**

Exercise One :

A/ Note the following patterns :

1 - Although [X] [Y]

1 - Although [the energy densities vary] [the identity factor remains stable]

2 - [X] but [Y]

2 - The energy densities vary] but [the identity factor remains stable]

B/ Join the two parts of each of the following sentences using although then but :

- a) The energy density increases / the potential barrier height goes down continuously.
- b) The experimental procedure has been carried out again under the same conditions / the results obtained were different.
- c) Melt depth are equal and natural cooling is employed / different defects are produced
- d) Low energy hydrogen ion implementation is used / the defects cannot be electrically neutralised.

Exercise Two :

- 1) On the basis of the data given in the table below, draw the course which represents the evolution of the ideality factor  $n$  in relation to the pulsed Nd-YAG laser energy density  $E$ .

<i>Ideality Factor <math>n</math></i>	<i>Energy Density <math>E</math></i>
1,00	0,5
1,50	0,6
2,00	0,7
2,50	0,8
3,00	0,9
3,50	1,0
4,00	1,1

- 2) Give the appropriate title to the curve.
- 3) Comment on the curve.
- 4) What conclusion(s) could be drawn?

Exercise Three :

A/ Examine the carefully the following examples :

- 1) A strong change occurs for energy density higher than a fluence threshold.

Short adjective  $\xrightarrow{\text{comparison}}$  adjective + er + than

- 2) The optical heating techniques are more advantageous than the other techniques.

Long adjective  $\xrightarrow{\text{comparison}}$  more + adjective + than

B/ Make comparisons using the words between brackets :

- 1) By a large-area incoherent lamp, heat source proved to be (reliable) the other thermal annealing techniques
- 2) Schottky diodes made on reference unirradiated samples exhibits (good) and (reproducible) rectifier electrical characteristics
- 3) The energy densities used at the beginning of the experiment were (low) 0,3J/cm<sup>2</sup>
- 4) V<sub>bn</sub> remains (constant) for the low energy densities
- 5) Above the threshold the degradation that occurs is (fast)
- 6) Impurities such as oxygen and carbon are (present) at high levels of concentration in CZ grown silicon.

### Part Six : Language Output

Exercise One :

Write a summary of the text studied.

Exercise Two :

Present the scientific research undertaken during your post-graduate studies under the form of a research article. Your article should include :

An abstract

An introduction

The experimental procedure

The experimental results (obtained or expected) and a discussion on them

The conclusions drawn or expected

Write the summary of your own scientific research.

## Part Seven : Free Reading

Text :

### *Optical Properties of Microcrystalline Thin Film Solar Cells*

#### *Abstract*

*Microcrystalline silicon solar cells based on pin and nip layer sequences require an effective light trapping in the near infrared (NIR) to enhance the long wavelength spectral response. Therefore, the effect of interface roughness on the optical properties of microcrystalline pin and nip solar cells was investigated. Based on a detailed analysis of scattering properties of textured substrates the device performance of the realized solar cells deposited by plasma enhanced chemical vapour deposition is discussed. The roughness of the substrates is controlled by a chemical etching step of the ZnO layer, which yields to a root mean square roughness  $\delta_{rms}$  between 10 and 150 nm. The pin diodes deposited on substrates with a roughness exceeding 40nm show a similar red response although the haze and the angle resolved scattering properties of the substrate differ significantly. It is also found that light trapping in nip structures is less effective than in pin structures.*

#### 1. INTRODUCTION

*The application of textured transparent conductive oxide (TCO) layers to amorphous (a-Si :H) and microcrystalline ( $\mu$ c-Si :H) solar cells based on pin or nip structures is a widely employed method to improve the absorption in thin film solar cells. As a result of this texture all subsequent interfaces in the solar cell are also rough. When light strikes a rough interface, scattering occurs. Scattering of transmitted and reflected light prolongs the effective light path in the absorber layer and increases the quantum efficiency considerably, especially beneficial for the long wavelength region.*

*In the ideal case, the solar radiation is scattered, repeatedly reflected (light trapping) within the solar cell and absorbed after multiple passes through the intrinsic layer which generates the photocurrent. However, a state-of-the-art  $\mu$ c-Si :H solar cell of electronically reasonable thickness (2-3  $\mu$ m) loses more than 20% ( $>10\text{mA/cm}^2$ ) in short-circuit current due to insufficient light absorption caused by not sufficiently knowledge of the relationship between structural properties, e.g. feature size, and the scattering process.*

*Light scattering at rough interfaces depends on the wavelength, the interface roughness ( $\delta_{rms}$ ), the morphology, the refractive indices of the media and the light incident angle. It is the purpose of this paper to verify the applicability of already existing theories and to develop functional relationships based on various experimental investigations of*



rough surfaces in order to discuss the light scattering thin film solar cells. Therefore, two different device structures are investigated and the quantum efficiencies and the solar cell parameters are determined.

Depending on a pin or nip deposition sequence, the microcrystalline layers are deposited on a glass/ZnO textured substrate employed as a transparent front contact or a glass/ZnO textured/Ag/ZnO highly reflecting back contact, respectively. The texture of sputtered ZnO:Al film is controlled by a chemical etching step in diluted hydrochloric acid (HCl).

## 2. EXPERIMENT

The boron doped, intrinsic and phosphorous doped microcrystalline layers were deposited in a multi-chamber deposition system by plasma enhanced chemical vapor deposition (PECVD) under very high frequency condition (VHF) of 95 MHz on glass substrates coated with textured TCO for pin diodes and glass/ZnO textured/Ag/ZnO substrates for nip diodes. The i-layers of the diodes were deposited with a silane concentrations in hydrogen ( $[\text{SiH}_4]/([\text{SiH}_4]+[\text{H}_2])$ ) of 5%.

The thickness of the absorption layer is  $1\mu\text{m}$ . The ZnO films were deposited in a Lesker high vacuum sputtering system. The topology of the rough front TCOs and reflecting substrates were characterized by means of atomic force microscopy (AFM). Optical transmission and reflection were carried out by using a photogoniometer and a spectrometer.

The topology and optical measurements are brought in context through analytic haze calculations. Measurements of the I/V-characteristics were performed under AM1.5 illumination. The QE was measured under a photon flux less than  $10^{14}\text{ cm}^{-2}\text{ s}^{-1}$ .

## 3. RESULTS AND DISCUSSION

### 3.1. Substrate characterization

The root mean square roughness  $\delta_{\text{rms}}$  as the characteristic vertical surface parameter and the correlation length  $a_{\text{corr}}$  as the lateral characteristic surface parameter of these ZnO surfaces are shown in table 1. The material properties and the behavior upon etching of the ZnO also depend on the deposition parameters during the ZnO sputtering process. The films were optically characterized by measurements of diffuse and total transmission and reflectance.

Table 1 : Root mean square roughness ( $\delta_{\text{rms}}$ ) and correlation length ( $a_{\text{corr}}$ ) in dependence of the etching time of the glass/ZnO substrates

Etching time(s)	$\delta_{rms}(nm)$	$A_{corr}(nm)$
5	38	133
7	52	169
15	85	304
25	98	336
50	124	451

The effect of the etching time on the fraction of diffusely scattered light can be expressed by the haze which is defined for reflection and transmission by the following equation

$$H_R = \frac{R_{diff}}{R_{total}}, \quad H_T = \frac{T_{diff}}{T_{total}} \quad (1)$$

where the lower case 'diff' denotes the diffused and 'total' the total reflection or transmission. The measured haze for the etching series is plotted in Figure 1. The fraction of diffused light increases with increasing etching time in the whole wavelength range. In particular, the haze at 800 nm of the 50s etched substrate exceeds 40%. The commonly used analytic function for the haze in reflection in relation to  $\delta_{rms}$  and the wavelength  $\lambda$  of the incident light is generated by the scalar scattering theory.

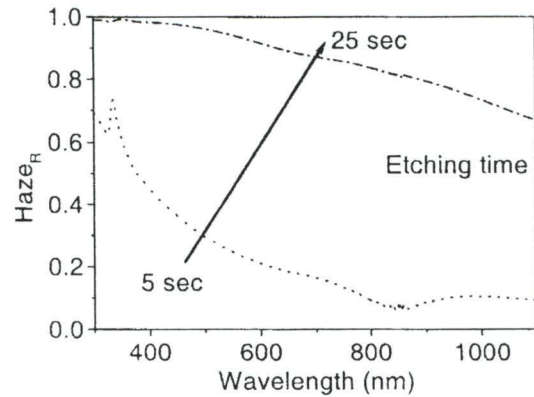
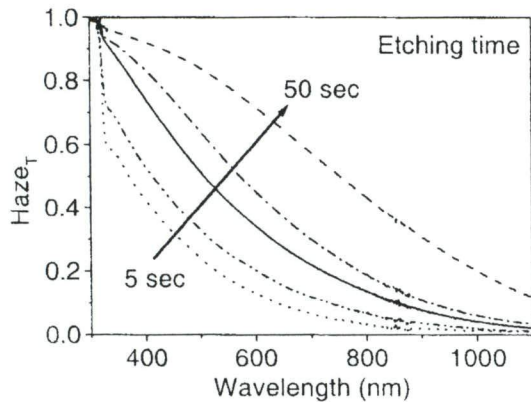
$$H_R = 1 - \exp\left\{-\left(\frac{4\pi\delta}{\lambda}\right)^2\right\} \quad (2)$$

This formula is based on the assumptions that (I) the scattering surface is perfectly conducting and that (II)  $\delta/\lambda \ll 1$ . To apply this formula to scattering by ZnO surfaces, the glass/ZnO substrates are coated with a thin (200nm) silver layer and only wavelengths  $800nm < \lambda < 1100nm$  were considered. By proceeding in that manner ZnO-layers and their roughness can be characterized by means of haze measurement in reflection.

A comparison of the rms-roughness derived from AFM and haze measurement shows a good agreement and confirms the applicability of the chosen techniques and theories. Defining an expression for the haze in transmission from equation (2) for the textured glass/ZnO substrates, an agreement between measured haze in transmission and roughness is not given. Reasonable fits are only achieved for powers in the exponential of larger than 3 instead of 2 and effective roughness smaller by a factor of 1-2.

In figure 2 the Haze of the back contact (air/ZnOtextured/Ag/ZnO) of the nip substrates with different etching times is shown. The Haze at 800 nm enhances of the 5s etched substrate from 10% to over 80% of the 25s etched ZnO back contact due to the increased roughness of 30 nm and 105 nm, respectively.





#### 4. CONCLUSION

The effect of interface roughness ( $\delta rms$ ) of 10 up to 120 nm on the optical properties of microcrystalline pin and nip solar cells was investigated. The various haze ( $\delta rms/\lambda$ ) measurements of the textured substrates showed the inapplicability of straightforward transmission and reflection coefficients for the whole  $\delta rms/\lambda$ . Light trapping in nip structures is less effective than in pin structures. For both structures parasitic absorption reduces the short-circuit current by up to 20%.

The QE of the nip structures shows interference fringes in the long wavelength range as a consequence of coherent wave propagation whereas the QE of pin structures shows similar values without interference fringes for a  $\delta rms$  exceeding 40 nm.

Adapted From : Renewable Energies Magazine( 2004)  
Vol.3,N°1 : 49-56

#### 4.4.3. Units Contents :

The designed samples are supposed to be two examples from the year syllabus. Their aim is to develop in the students undertaking post-graduate studies an ability to handle the kind of written and spoken English that they will be concerned with as an integral part of their specialist-subject. They also seek to make them aware of the way English is used for a meaningful and purposeful communication in the target situation.

Since the learners under consideration are post-graduate students with, a least, an experience of six years of English instruction; although this is not reflected in their present level; the units suggested seek also to relate these learners' previously acquired linguistic knowledge to meaningful realizations of the language system in passages of immediate relevance to their specialist studies, on the one hand. On the other hand, the units aim to develop in these learners an understanding of how their subject-matter is expressed through the medium of English.

The first unit is part of the first semester. Through its content and activities, it drives the learners into some basic scientific uses of the target language. Besides describing and classifying, it trains them to classify elements according to their properties and to use scientific and mathematical formula. Furthermore, it provides



practice in essay and report writing, which constitute important tasks in the target situation.

The second unit is planned to be taught among the last units of the year. The text tackled includes a more important amount of real-life language and a more specialised one, and this implies, therefore, more complex uses of the target language. The text selected constitutes a scientific research article extracted from an international subject-specific magazine. Besides its authenticity, it paves the way for a variety of language activities. It also trains the learners to extract and interpret data from non-verbal forms of the language such as curves and graphs. Furthermore, the unit provides an opportunity for the learners to report about their own scientific research and to present them under the form of publishable research articles.

Throughout the activities suggested, the researcher as attempted to avoid mechanical drills and repetitive patterns practice. The students are scientists whose minds are directed towards rational thought and problem-solving and the exercises provided have been designed to take this fact into account. Wherever possible, the investigator has used activities which require the same kind of mental activity as scientists would naturally be engaged in as part of their specialist studies.

In both units, the degree of language complexity varies in a regular way. The presentation of each unit takes the form of a cycle with a simpler treatment of the subject-matter at the beginning and working up to a more complex treatment at the end. In the earlier parts of each unit, the material is presented in a simple language in order to get the students to concentrate on the rhetorical fractures used in scientific writing. Moreover, in the final sections, the language is more complex, and is intended to approximate the kind of language that the students will find in their scientific careers.

#### **4.5. Conclusion :**

In this concluding chapter, the researcher has attempted to out a set of suggestions that may help to improve the prevailing ESP teaching/learning conditions identified in the previous chapter and to remedy students' lacks. Some administrative reforms were first recommended in order to reconsider the status of English in the curriculum and student's preparation to undertake ESP courses. After that, the investigator has suggested a hoped-to-be ESP course design and conduct process before speaking about the ought-to-be newly expected ESP teachers and learners rights and duties.

The researcher has closed this chapter by the design of some sample units hoped to account for the needs of the students under consideration. For this purpose, a set of themes and language activities have been selected. These activities have tried to develop the four skills and related sub-skills, and to provide practice in vocabulary, grammar, language use and language production; with the hope to bridge the gap between students' present knowledge of English and what is required in the target situation.

## **GENERAL CONCLUSION**

The present work has concentrated on providing an overall analysis of the ESP teaching/learning situation in the Department of Physics, at the level of Aboubakr Belkaid University, Tlemcen, with close reference to the first-year post-graduate students. The main aim of such an analysis was to sort out the major causes of failure of this, and probably other, ESP teaching/learning situations.

Students in this Department and in others nation-wide, need to learn to use English to perform either academic or occupational purposes. Nevertheless, they have great difficulties understanding and producing even very simple sentences. For this reason, we have judged it useful to analyse the teaching/learning situation of the concerned level in order to identify the main causes of such difficulties and to provide data for the content of the suggested materials that have been designed in the last chapter of the work.

First, we have given an overview of English for Specific Purposes and the main variables involved when designing such a course. Since the aim of ESP is to enable the learners to communicate effectively in specific situations, it is, therefore, essential to analyse students' target needs and determine their lacks as well as wants. This is generally done through the needs identification and analysis phase which should constitute the basis of all ESP teaching operations.

In the second part of the work, the researcher has described the current ESP situation investigated, including the teachers, the learners and the teaching materials used, before undertaking her data collection. During such a process, the investigator has had recourse to the use of several research tools depending on the sources used and the information sought for. For the sake of triangulation of perspectives, the classroom has been observed, the teachers interviewed, and a questionnaire has been distributed to the learners.

The data collected has been rigorously analysed. The results obtained revealed the existence of a considerable gap between students' level of proficiency and the one required in the target situation. Moreover, extra pedagogical problems have been identified such as the lack of syllabus, teaching aids and time constraints, in addition to the use of 'sporadic' teaching material and the lack of ESP teachers' training. For these reasons, several recommendations have been introduced in the last chapter and which are hoped to improve the learning situation and to remedy of the major inconsistencies identified.

After the suggestion of a plan for the production of suitable ESP materials, some sample units have been designed in the last part of the work, in the hope to remedy the lacks identified and to overcome the difficulties encountered by both teachers and learners, to sustain interest and reach course objectives.

Although ESP, its teaching and learning are gaining great importance and attention in today's world, the situation is far from being the same in our country. What



has been mentioned and described throughout this work reflects, unfortunately, what is actually happening at the national level. Therefore, the different suggestions provided were just an attempt to set a more supportive and promoting environment for ESP teaching and learning. It is hoped, thus, that they will be useful for those who are likely to learn or work in the same situation and under the same conditions.

Besides, it stands to reason that it is up to the Ministry of Higher Education and Scientific Research to implement the necessary reforms and set up adequate syllabuses for the different ESP courses, which could be taken seriously so as to eradicate the prevailing problems, and arouse enthusiasm and interest among learners and teachers alike.

Moreover, it would be beneficial and time-saving if the educational authorities could take some measures concerning ESP teachers' training which is viewed as one of the major obstacles in those teachers' quests for more professionalism.

Even if it would seem difficult and painstaking, implementing the different changes needed consists an emergency not only to cope with the requirements of the target situation, but to keep pace with the multiple increasing demands of the scientific and technological world, as well.



# *BIBLIOGRAPHY*

## BIBLIOGRAPHY

- Allen, J.P.B. (1984) *General Purpose Language Teaching : A Variable Focus Approach*. Brumfit, C.J. (ed.) : np.
- Allen, J.P.B. and Widdowson, H .G. (1974) *English in Physical Science*. Oxford : Oxford University Press.
- Allright, D. (1989) *Observation in the Language Classroom*. London : Longman.
- Amon, U. and Hollinger, M. (1992) *Status Change of Languages*. New York/Berlin : Walter de Gruyter.
- Ashworth, M. (1985) *Beyond Methodology*. Cambridge : Cambridge University Press.
- Bacha, N. (2004) << English across Academic and Professional Communities : a Case study of EFL Learners' needs at the Lebanese American University>>. From the Annual Conference at Cambridge University, England : Cambridge University Press.
- Basturkmen, H. (1998) << Refining Procedures : A Needs Analysis Project at Kuwait University>>. *English Teaching Forum* 36/4 :2-9.
- Bautier, E. (1980) <<Apprendre une Langue Seconde ou Continuer a Apprendre a Parler en Apprenant une Langue Seconde ?une Réponse Psycholinguistique>>. *Ligne de Force du Renouveau Actuel en Didactique des Langues Etrangères*. Paris : Clé Internationale.
- Benmoussat, S. (2003) *Mediating Language and Culture : An Investigative Analysis of the Cultural Dimension in the Algerian Newly-Designed ELT Textbooks*; PhD Thesis. University of Tlemcen : Algeria.
- Blue, G.M. (2001) <<Determining the Language Learning Needs of Students of Art and Design>>. *Elements of Course Design*. University of Southampton : Alladin edition.
- Brooks, B.C. (1980) *Scientifically Speaking : An Introduction to English of Science and technology*. Southampton : The Chamelot Press.
- Broughton, G. (1981) *Teaching English as a Foreign language*. Ed.J.Eggleston, London.
- Brown, H.D. (1993) *Principles of Language Learning and Teaching*. Cambridge : Cambridge University Press.

- Brumfit, C.j. (1984) *Communicative Methodology in language Teaching*. Cambridge : Cambridge University Press.
- Carell, P. and Carson, j. (1997) <<Extensive and intensive Reading in an EAP Setting>>.ESP Journal 14/1 :47-60.
- Carver, D. (1984) <<Some Propositions about ESP>>.The ESP Journal 3/1 :131-135.
- Corder, S.P. (1973) *Introducing Applied Linguistics*. Harmondsworth, Middlesex : Penguin Books Ltd.
- Crystal, D. (1997) *English as a Global Language*. Cambridge : Cambridge University Press.
- Duan, P. and Due,W. (2004) <<Teaching Trial and Analysis of English for Technical Communication>>. ELT Journal 6/5 : 1-2.
- Dubin, F. and Olshtain, E. (1986) *Developing Programmes and Materials for Language Teaching*. Cambridge : Cambridge University Press.
- Dudley, E. and John, A.M. <<English for Specific Purposes : International in Scope, Specific in Purpose>>.TESOL Quarterly 25/2 :297-314.
- Dudley, E. and St John, M. (1998) *Developments in English for Specific Purposes : A Multi Disciplinary Approach*. Cambridge : Cambridge University Press.
- Duff, P.A. (2001) *Learning English for Academic and Occupational Purposes*. TESOL Quarterly 35/4 : 606-607.
- Escribano, P.D. (1999) <<Teaching Writing through Reading : A Text-Centred Approach >>.English Teaching Forum 4/1 :55-60.
- Finocchiaro, M. (1974) *English as a Second Language : From Theory to Practice*. New York : Regents Publishing Company.
- Flook, D. (1993) <<Are Authentic Materials a Pre-requisite for an ESP Course>>.The ESP Maghreb Conference. The British Council,London.
- Flowerdrew, J. (2002) <<Attitudes of Journal Editors to Non-native Speaker Contributions>>. TESOL Quarterly 35/1 :121-150.
- Flowerdrew, J. and Peacock, M. (2001) *Research Perspectives on English for Academic Purposes*. Cambridge : Cambridge University Press.
- Gardner, R.C. and Lambert, W.E. (1972) *Attitudes and Motivation in Second Language Learning*. Massachussets : Newberry House Publishers Incorporation.



- Gulliver, T. (2001) <<EAP in Korea :Working Together to Meet Changing Needs>>. The Korea TESOL Journal 4/1 : 93-118.
- Guoqiang, Z. (1989) <<Reinforcing Communicative Activities in Teaching EST>>.English Teaching Forum 27/2 : 37-39.
- Hamp-Lyons, L. and Heasley,B. (1987) Study Writing : A Course in Written English for Academic and Professional Purposes. Cambridge : Cambridge University Press.
- Harmer, J. (1983) The Practice of English Language Teaching. New York : Longman.
- Hutchinson, T. and Waters, A. (1984) <<How Communicative is ESP? >>English teaching Forum 38/2 : 108-118.
- Hutchinson, T. and Waters, A. (1987) English for Specific Purposes : A Learning-Centred Approach. Cambridge : Cambridge University Press.
- James, K. (1984) <<Speak to Learn oral English for Academic Purposes >>. London and Glasgow : Collins ELT.
- Johns, A.M. (1995) <<Interpreting an English Competency Examination : The Frustrations of an ESL Science Student. Written Communication 8 :379-401.
- Jordan, R.R. (1997) English for Academic Purposes : A Guide and Resource Book for Teachers. Cambridge : Cambridge University Press.
- Kennedy, C.H. and Bolitho, R. (1984) English for Specific Purposes. London : Mc Millan press Ltd.
- Lado, R. (1957) linguistics Across Cultures. Ann Arbor : University of Michigan Press.
- Long, M. (1996) <<Course on Task-based Language Learning>> .The ESP Forum 14/6 : 9-12.
- Mackay, R. and Mountford, A. (1978) English for Specific Purposes : A Case Study Approach. London : Longman.
- Markee, N. (1997) Managing Curricular Innovation. Cambridge : Cambridge University Press.
- Mc Donough, S. (1984) ESP in Perspectives. London and Glasgow : Collins ELT.
- Meads, R. (1978) <<Students' Needs and the Authenticity of ESP Materials>>.ESP MASL Journal.

- Miliani, M. (1984) Objectives, Curriculum Design and Methods for the Teaching of ESP-Algeria-with Special Reference to the Teaching of English in the Department of Economic Sciences in Oran; Ph.D Thesis. University of Swales : United Kingdom.
- Miliani, .M. (1994) <<English for Specific Purposes>>. Seminar Presented in Magister Course.I.L.E. : Tlemcen.
- Miliani, M. (1994) <<Syllabus Design>>. Seminar Presented in Magister Course.I.L.E. :Tlemcen.
- Munby, J. (1978) Communicative Syllabus Design. Cambridge : Cambridge University Press.
- Nunan, D. (1988) Syllabus Design. Oxford : Oxford University press.
- Nunan, D. (1990) <<Syllabus Design>>.ELT Journal 44 :2 :157-159.
- Nunan, D. (1991) Classroom Interaction. Sydney : National Centre of English Language Teaching and Research.
- Nunan, D. (1992) Research Methods in Language Learning. Cambridge : Cambridge University Press.
- Nunan, D. (1993) <<Action Research in Language Education>>. Teachers Develop Teachers' research : 39-50.Oxford : Heineman Publishers.
- Palmer, J.D (1999) <<Teaching Language to Heterogeneous Classes in ESP>>.ESP Journal 14/6 : 5-8.
- Richards, J.C. and Lockhart, C. (1996) Reflective Teaching in Second Language Classroom. Cambridge : Cambridge University Press.
- Richterich, R. (1983) Introduction to Case Studies in Identifying Language Needs. Oxford : Pergamoun Press.
- Richterich, R. and Chancerel, J.L. (1980) Identifying the Needs of Adults Learning a Foreign Language. Oxford : Pergamon Press.
- Rivers, W.M. (1965) Teaching Foreign Language Skills. Chicago : University of Chicago Press.
- Robinson, P. (1980) ESP (English for Specific Purposes). Oxford : Pergamon Press.
- Robinson, P. (1991) ESP Today. Herdford Shire : Prentice Hall International Ltd.
- Sculthorpe, J. (1980) Teaching English as a Foreign Language. London : London Group Ltd.

- Senhadje, J. (1993) <<Needs Analysis and Approaches to Syllabus Design>>.The ESP Maghreb Conference. The British Council,London.
- Smith, B. (1987) Learning English. A Teacher's Guide to Interference and Other Problems. Cambridge : Cambridge University Press
- Smoak, R. (2003) <<What is English for Specific Purposes? >>. English Teaching Forum 17/4 : 21\_27.
- Strevens, P. (1977) New Orientations in The teaching of English. Oxford : Oxford University Press.
- Strevens, P. (1988) <<The Learner and the Teacher of ESP>>. Chamberlain and Baumgardner 6 : 39-44.
- Swales, J. (1985) Writing Scientific English : A Textbook of English as a Foreign Language for Students of Physical and Engineering Sciences. Thomas Nelson and Sons.
- Tudor, I. (1993) <<Teacher Roles in the Learner-Centred Classroom>>. English teaching Journal 47/6 :41-43.
- Van Els et.al, (1984) Applied Linguistics and the Learning of Foreign Languages. USA : Edward Arnold Ltd.
- Van Lier, L. (1995) Introducing Language Awareness. London : Penguin English applied Linguistics Series.
- Wajnrub,R. (1993 ) Class Observation Tasks. Cambridge : Cambridge University Press.
- Wallace, M.J. (1998) Action Research for Language Teachers. Cambridge : Cambridge University Press.
- Weir, C. and Roberts, J. (1993) <<Evaluation in ELT>> .Applied Language Studies. London : Penguin.
- West, R. (1993) <<Needs Analysis in Language Teaching>>. Language Teaching : 1-15.
- Widdowson, H.G. (1978) Teaching Language as Communication. Oxford : Oxford University Press.
- Widdowson, H.G. (1979) Explorations in Applied Linguistics. Oxford : Oxford University Press.
- Widdowson, H.G. (1987) <<Aspects of Syllabus Design>>.Syllabus design : The State of the Art, Tickoo, M. (ed.); Singapore : Regional English Centre.



- Wilkins, D.A. (1989) *Linguistics in Language Teaching*. London : Athenaeum Press.
- Yalden, J. (1987) *Principles of Course Design for Language Teaching*. Cambridge : Cambridge University Press.

# *APPENDICES*

*A Sample Course from*  
*Students' Syllabus*



## A Sample Course from Students' Syllabus

### Text :

#### *Electric Power*

*Electric power is one of the most important forms of energy. We cannot see, hear or smell electricity but we know about it by what it does. It serves almost every home, farm, store and factory in the world, but where is it produced and how is it transmitted and distributed?*

*Most of the electric power required for industrial and domestic purposes is generated in power situations by large generators. A generator does not create energy. It changes mechanical energy into electrical energy. Every generator must be driven by a turbine. A typical power plant generator may have a capacity of up to 1 million kilowatts. A 100.000 kilowatt generator can supply enough electricity to light a million 100 – watt light bulbs at any given time. The amount of electric power that a power plant actually produces is measured in kilowatt – hours. Power stations are either conventional thermal, generators are driven by steam turbines or as turbines. In hydroelectric plants, water stored up behind dams or falling through penstocks rotates the turbines. Nuclear power plants generate electricity in exactly the same way as steam turbine plants. The only difference is that a nuclear power plant uses a nuclear reactor as a furnace to heat water into steam instead of using a coal or oil burning furnace.*

*Generating electricity is only a part of the process of supplying electric power. The electricity must be transmitted from the power plant to the city or area that uses it through high voltage lines. Then the electricity must be distributed to homes, farms, factories and other individual users. A generator in a power plant may produce electric current with voltage up to 22.000 volts.*

### Reading comprehension :

#### Exercise n°1 :

Read the text carefully then answer these questions.

- 1) How do we know about electricity?
- 2) Where is electric power obtained?
- 3) What is the function of a generator?
- 4) How is the amount of electric power measured?
- 5) What kinds of power stations are mentioned in the passage?
- 6) What do the steam turbines do?
- 7) What is the difference between a hydroelectric plant and a nuclear power plant?
- 8) How is the electricity transmitted do the city?

Exercise n°2 :

Find words that are synonym to the following words :

- |             |            |               |              |              |
|-------------|------------|---------------|--------------|--------------|
| 1 – Kind    | 2 – Nearly | 3 – Demanded  | 4 – Produced | 5 – Converts |
| 6 – Quality | 7 – Turns  | 8 – Operation | 9 – Sent     | 10 – Place   |

Exercise n°3 :

Translate into French or Arabic the first paragraph from “Electric power...” to “...into electrical energy”

*Students' Questionnaire*



# QUESTIONNAIRE

## Instructions :

Dans le cadre d'une recherche ayant pour objet de dresser un programme d'Anglais répondant aux besoins des étudiants de première année Magister Physique, vous êtes priés de bien vouloir répondre à ce questionnaire :

01. Sex : Male (.....) Female (.....)	01. Sexe : Masculin (.....) Femelle (.....)
02. Age : ..... Years	02. Age : .....Ans
03. How long have you been learning English ? ..... Years	03. Pendant combien d'années avez-vous étudié l'Anglais ? .....Ans
04. How long have you stopped practising English after the Secondary School ? 1 year (.....) 2 years (.....) 3 years (.....) 4 years (.....) 5 years (.....) More, please specify .....	04. Pendant combien d'années n'avez-vous pas pratiqué l'Anglais après le lycée ? 1 année (.....) 2 année (.....) 3 année (.....) 4 année (.....) 5 année (.....) Plus, veuillez préciser, S.V.P .....
05. Have you had English courses at the university level ? Yes (.....) No (.....) If yes, at which level? ..... What was the nature of these courses? .....	05. Avez-vous eu des cours d'Anglais au niveau de l'université ? Oui (.....) Non (.....) Si oui, à quel niveau? ..... Quelle était la nature de ces cours? .....
06. What is your level in English ? Beginner (.....) Intermediate (.....) Advanced (.....)	06. Quel est votre niveau en Anglais ? Faible (.....) Moyen (.....) Avancé (.....)
07. How large is your group ? 10 students (.....) Between 10 and 20 (.....) Between 20 and 30 (.....) More, please specify .....	07. Quel est le nombre d'étudiants dans votre groupe ? 10 étudiants (.....) Entre 10 et 20 (.....) Entre 20 et 30 (.....) Plus, veuillez préciser, SVP .....

08. Why are you learning English at the post-graduate level ?

.....  
 .....  
 .....

09. Is English important for you as a post-graduate student ?

- Very important (.....)
- Important (.....)
- Not so important (.....)

10. Are you motivated to learn English ?

- Yes (.....)
- No (.....)

Please, justify your answer

.....

11. Do you think that the courses provided by your teacher respond to your target needs, as far as the English language is concerned ?

- Yes (.....)
- No (.....)

12. Do you appreciate your English courses ?

- Yes (.....)
- No (.....)

Please, justify your answer

.....

13. Which difficulties do you encounter in English, at this level ?

.....  
 .....  
 .....

14. According to you, what are the problems you encounter in English due to ?

.....  
 .....  
 .....

15. Would you classify these skills according to their importance to fulfil your target needs ?

- Listening 1 - .....
- Writing 2 - .....
- Reading 3 - .....
- Speaking 4 - .....

08. Pourquoi étudiez-vous l'Anglais au niveau de votre post-graduation ?

.....  
 .....  
 .....

09. Est-ce que l'Anglais est important pour vous en tant qu'étudiant en post-graduation ?

- Très important (.....)
- Important (.....)
- Peu important (.....)

10. Etes vous motivé à apprendre l'Anglais ?

- Oui (.....)
- Non (.....)

Veillez justifier votre réponse, SVP

.....

11. Trouvez-vous que les cours prodigués par votre enseignant répondent à vos besoins en Anglais ?

- Oui (.....)
- Non (.....)

12. Est-ce que vous appréciez vos cours d'Anglais ?

- Oui (.....)
- Non (.....)

Veillez justifier votre réponse, SVP

.....

13. Quelles sont les difficultés que vous rencontrez en Anglais, à ce niveau ?

.....  
 .....  
 .....

14. A votre avis, les problèmes que vous rencontrez en Anglais sont dus à quoi ?

.....  
 .....  
 .....

15. Veuillez classer ces aptitudes en fonction de leur importance pour atteindre vos objectifs en Anglais ?

- L'écoute 1 - .....
- L'écriture 2 - .....
- La lecture 3 - .....
- Le parler 4 - .....



16. Would you classify these skills according to their degree of difficulty in comparison to your level in English

- Listening            1 - .....
- Writing             2 - .....
- Reading            3 - .....
- Speaking            4 - .....

17. The time allocated to the English course per week is :

- Sufficient            (.....)
- Insufficient        (.....)

If insufficient, how many hours a week do you suggest?

..... Hours

18. What do you suggest about the number of years of English instruction in your field ?

.....  
 .....

19. Apart from university ESP courses, do you have recourse to other means to meet your needs and cater for your lacks in English ?

.....  
 .....  
 .....

20. Do you think that collaboration between the language teacher and the subject specialist can improve English teaching ?

- Yes                    (.....)
- No                     (.....)

21. Do you have any other remarks or suggestions to add ?

.....  
 .....  
 .....

*Thank You*

16. Veuillez classer ces aptitudes en fonction de leur degré de difficulté par rapport à votre niveau en Anglais

- L'écoute            1 - .....
- L'écriture          2 - .....
- La lecture          3 - .....
- Le parler            4 - .....

17. le temps alloué aux cours d'Anglais par semaine est :

- Suffisant            (.....)
- Insuffisant        (.....)

Si insuffisant, combine d'heures suggérez-vous par semaine?

.....Heures

18. Que suggérez- vous quant au nombre d'années d'Anglais dans votre domaine ?

.....  
 .....

19. A part les cours prodigués à l'université, avez-vous recours à d'autres moyens pour répondre à vos besoins et remédier à vos manques en Anglais ?

.....  
 .....  
 .....

20. Pensez-vous qu'une collaboration entre l'enseignant de la langue et l'enseignant de spécialité peu améliorer l'enseignement en Anglais ?

- Oui                    (.....)
- Non                    (.....)

21. Auriez -vous d'autres remarques ou suggestions à faire ?

.....  
 .....  
 .....

*Merci*



*Teachers' Interview*

# INTERVIEW

Dear Colleague

*I am presently conducting a research to try to design ESP teaching materials for first year post-graduate students, in the Department of Physics, at the level of Tlemcen University.*

*I would be very grateful if you could answer these questions. Your answers will be treated with the strictest confidence.*

01. Sex :	
Male	(.....)
Female	(.....)
02. Qualification	
License	(.....)
Magister	(.....)
Others, please specify	
.....	
03. Your experience in English Language Teaching	
Secondary level	..... Year(s)
Tertiary level	..... Year(s)
Other levels	..... Year(s)
04. Your experience in ESP teaching :	
..... Year(s)	
05. Have you had any specialized training before teaching ESP?	
Yes	(.....)
No	(.....)
If yes, please specify:	
Field(s)	.....
Year(s)	.....
06. How large are your classes ?	
10 students	(.....)
Between 10 and 20	(.....)
Between 20 and 30	(.....)
More, please specify	
.....students	
To which extent does this affect your ESP teaching?	
.....	
.....	
07. As far as your students are concerned, what is the weekly teaching time devoted to ESP instrumentation ?	
.....	
08. What is the level of your students?	
Advanced	(.....)
Intermediate	(.....)
Beginner	(.....)

09. Are your students motivated during their English course?

.....  
 .....

10. What are their attitudes towards the English course?

.....  
 .....

11. Is there any syllabus provided by your Department?

.....  
 .....

12. Is there any material provided by your Department?

.....  
 .....

13. How much time do you spend to cover a complete unit?

.....  
 .....

14. Generally speaking, what kind of activities do you plan for a given unit?

.....  
 .....

15. Speaking about the language skills (reading, writing, listening, speaking), what is the importance devoted to each during an ESP course?

.....  
 .....  
 .....

16. Do you use French and/or Arabic in your ESP teaching?

.....  
 .....  
 .....

17. Do your students use French and/or Arabic during their English class?

.....

18. Do you think that the content provided to your students is relevant to their needs?

.....

19. Can you enumerate the different problems encountered when teaching ESP?

.....  
 .....  
 .....



20. Do you think that the weekly time devoted to English teaching is sufficient, at this level?

If you find this weekly teaching time insufficient, what do you suggest?

Yes (.....)

No (.....)

Please justify your answer:

.....  
If you find this weekly teaching time insufficient, what do you suggest?

.....

21. Do you think that two years of English instruction (one at the tertiary level and one at the post-graduate level) are sufficient to meet learners' target needs?

Yes (.....)

No (.....)

If no, what do you suggest?

.....

22. Do you consider the collaboration between the language teacher and the subject specialist as necessary?

Yes (.....)

No (.....)

Please justify your answer::

.....

23. Do you have any remarks or suggestions to remedy the various problems and improve the ESP teaching/learning situation?

.....

.....

.....

*Thank you for your co-operation*