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PROMOTING CRITICAL READING STRATEGIES AMONG ALGERIAN ESP
STUDENTS: A CASE STUDY

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DECLARATION

I hereby declare that this thesis is the result of my original research. References to other people's research have been duty cited and acknowledged in this research work accordingly.

<div align="right">Safia BENSAAD</div>

DEDICATION

To my beloved mother and late father

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Abstract

Recent changes have affected every human enterprise including higher education institutions which are nowadays required, more often than not, to wisely face permanently imposed challenges. Considering the ESP field, a paradigm shift from traditional to a more critical pedagogy was inevitable, which has entailed a wide interest in developing learners' higher order thinking skills and critical reading abilities rather than acquiring the language per se. Relevant to this, an urge is felt to argue for the significance of promoting critical reading strategies among Algerian ESP students, particularly at the National Higher School for Hydraulics (ENSH). For doing so, a mixed methods experimental research design has been adopted. The focus is principally made on explicitly instructing engineering students in critical reading strategies in order to: (1) raise their awareness of critical reading strategies use while dealing with specialized material in English; (2) promote their critical reading abilities and empower them as critical readers; (3) increase their motivation towards learning English in general and the reading skill in particular; and (4) help them overcome difficulties they used to encounter when reading in English. Furthermore, the study has been accomplished by means of three research instruments, to wit: the Critical Reading Strategies Awareness Questionnaire (CRSAQ) developed by the researcher, a critical reading test, and students' reflective journals. The statistical analysis and examination of the collected data, using the SPSS program version23, provided evidence and validated the hypotheses presumed by the study. In that, explicitly instructing ESP students into critical reading strategies has promoted their critical reading strategies awareness and enhances their critical reading abilities; meanwhile, it has increased their motivation towards the English language as well as the reading skill which helps them overcome their difficulties of reading specialized material in English. Yet, in the light of these findings, some recommendations are put forward to ameliorate the Algerian ESP enterprise and similarly encourage ESP practitioners to shift focus from traditional to more critical pedagogic practices.

Key words: critical reading; critical reading strategies; ESP; explicit instruction.

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List of Abbreviation and Acronyms

CALLA: Cognitive Academic Language Learning Approach

CRCT: Critical Reading Comprehension Test

CRS: Critical Reading Strategies

EFL: English as a Foreign Langugage

ENSH: Ecole Nationale Superieure de L'Hydraulique

ESP: English for Specific Purposes

ESL: English as a Second Language

IRA: Index of Reading Awareness

L1: First Language

L2: Second Language

LLS: Language Learning Strategies

MARSI: Metacognitive Awareness of Reading Strategies Inventory

MCQ: Multiple Choice Questions

MRAI: Metacognitive Reading Awareness Inventory

MCR: Mastering Critical Reading

SILL: Strategy Inventory for Language Learning

SORS: Survey of Reading Strategies

TALO: Text as a Linguistic Object

TASP: Text as a Stimulus/Springboard for Production

TAVI: Text as a Vehicle for Information

General Introduction

The ultimate goal of any wisely established educational system is to provide well rounded individuals who are capable of facing continuous world changes. Individuals who are able to analyse, synthesise, judge, interpret and evaluate any situation they may come through in their daily lives, especially in nowadays circumstances. Yet, to do this efficiently and effectively, Taglieber, L. confirms that "citizens must be able to evaluate critically what they see, hear and read" (2003, p.141). Indeed, the formation of such kind of individuals requires a solid educational programme that can respond to the present international challenges through the promotion of higher order thinking skills. The latter is also known as critical thinking and it can be boosted through critical reading – also referred to as critical literacy – which is indispensible throughout all educational levels and in all academic studies including English as a foreign language.

Furthermore, the educational field of teaching/ learning English as a foreign language is gaining momentum all over the world thanks to globalization. The latter has imposed English as the current *lingua franca* that most of, if not all, world countries are urged, more often than not, to provide the necessary frameworks to teaching/learning English as a second or foreign language, especially after being established as the first world language of science and technology. The new position of the English language has created, as put forward by Hutchinson and Waters "a whole new mass of people wanting to learn English, not for the pleasure or prestige of knowing the language, but because English was the key to the international currencies of technology and commerce" (1987, p. 06). This has, undoubtedly, raised the need for integrating the teaching of English language in different educational levels in various countries, and Algeria is no exception.

On the other hand, the internalization of English as a foreign language has put forward considerable interest in EFL teaching / learning research for the sake of achieving a sufficient success in the target language communication proficiency. In fact, Algeria is one of the countries that devote thoughtful attention -though moderately compared to other countries- to teaching EFL throughout the different levels of its educational system. As such, the Algerian National Higher School for Hydraulics [Ecole Nationale Supèrieure d'Hydraulique] (henceforth ENSH), one of the greatest high schools of higher education and scientific research in Algeria, focuses enormously on instructing its students in English for Specific Purposes (henceforth ESP) aiming

at enabling them to read in English scientific documents dealing with hydraulics, to be familiar with the use of technical and scientific terminology in the field of hydraulics and to write meaningful sentences, coherent paragraphs and well organized critical research reports. As it is cited by Dahbi, Pitchard and Nasr (2004) believed that "English is of particular importance for engineering and science students because it is the principle international language of science and it is looked upon as an effective means for enabling those students to become familiar with professional texts written in English" (2016, p. 73).

Moreover, the importance of reading comprehension in the ESP classroom has been emphasised by many education researchers. For example, Cohen confirmed that "in a university setting where students are required to read content-course bibliographies in English, there is a need for reading comprehension courses in English" (2001, p. 367). Consequently, the issue of reading comprehension in our case study is pivotal. In addition, despite all the efforts forged to conduct a successful ESP course at the ENSH, students are still being unable to read and comprehend though superficially scientific documents written in English.

Nevertheless, with reference to the researcher's teaching experience at ENSH, it can be noticed that students, there, are highly motivated and considerably interested in studying English but not in reading scientific documents written in English though the role of the reading skill is undeniable in learning English as a foreign language. For this, Sonka, A. L. claimed that "reading must be considered as an essential component of ... English language program" (1979, p. 120). Moreover, Dubin, F. confirmed that "today, especially in language programs designed to meet specific needs,... the skill the students need most is reading" (1982, p. 128). Therefore, focussing on the development of the reading skill in ESP context, as suggested in the present study, is more than worth consideration; it is a must that Algerian ESP students have to be aware of and practice seriously not only for their academic achievements but even for their lifelong learning success.

Undoubtedly, students' lack of interest in reading in English can be due to various variables like their social background or giving more importance to speciality modules rather than English. In fact, with reference to the researcher's long teaching experience at ENSH, it has been realized that students' lack of interest and negative attitudes towards reading is mainly due to their ignorance of the essence of reading as a skill in general and how to read strategically in particular. In other words, these students lack appropriate knowledge of the reading process as well as reading strategies, precisely critical reading strategies that may motivate them towards

reading and promote their comprehension of academic material generally and critical reading particularly. As maintained by Wilson (2004, p. 01):

> "It is often assumed that students will acquire the ability to read critically simply by virtue of studying at University without active intervention from their teachers. We aspire for our students to read with a critical eye in order to develop their own reasoned and ethical position. However, the reality is that students often read as passive consumers of information".

Thus, to get the maximum benefit from any university course, learners have to develop and cultivate various ways and strategies of becoming efficient skilful readers.

Furthermore, nowadays, critical reading abilities development is perceived as not only the salient attribute to 21st century higher education, but even the most efficient tool that can empower learners, particularly in ESP context, to face the fast growing challenges of the modern world. In this vein, the researcher strongly believes in the efficiency of an explicit instruction in critical reading strategies for ESP students that may enable them to read with a critical eye and not accept anything at face value. Strategies that would strengthen their capacity to preview, predict, question and infer, annotate, analyse, self-regulate, and evaluate anything in a given material in their field of interest. However, to achieve this, students have to be made aware of how and when to use these strategies.

Relevant to this, the focal point of this research is to probe the significance of promoting Algerian ESP students' critical reading strategies by means of an explicit instruction that is aimed at raising their awareness about how and when to employ these strategies. Nevertheless, to deal with this question, other related sub-questions have to be taken into consideration:

1- Will critical reading strategies training promote the students' critical reading strategies awareness and use while reading field related material in English?
2- Will this critical reading strategies training enhance the students' critical reading abilities and empower them as critical readers?
3- Will this training positively affect the students' motivation towards English in general and the reading skill in particular?
4- Will this training enable the students to overcome their reading difficulties in English?

In the same vein, the researcher hypothesises that integrating critical reading strategies into ESP instruction will raise the students' awareness and use of these strategies, especially when

reading specialized material in English. Meanwhile, the following sub-hypotheses are put forward:

1- Training ESP students explicitly into critical reading strategies will promote their awareness and use of these strategies while dealing with field related material in English.
2- Training ESP students into critical reading strategies will enhance their critical reading abilities and empower them as critical readers.
3- The training will also increase the students' motivation towards learning English in general and the reading skill in particular.
4- It will also help them overcome the reading difficulties they used to suffer from when reading specialized material in English.

To investigate the above research questions and validate the related hypotheses, the researcher opted for explicitly instructing ESP students in critical reading strategies through integrating critical reading activities in a case study which has been dealt with experimentally. Based on a mixed methods experimental design, the study comprises 100 first year students enrolled in the engineering classes of the academic year (2016-2017). These students constitute the study population that is divided into experimental and control groups. The experimental group received the new instruction whereas the control group followed the usual traditional way of teaching ESP that is based on comprehension of technical texts. Yet, to find out the impact of the new instruction data collected from a critical reading test, Critical Reading Strategies Awareness Questionnaire developed by the researcher, and students' reflective journals, were analysed using SPSS version23. In fact, the interpretation and discussion of the results yielded positive outcomes; in that the proposed instruction has significantly impacted the students' critical reading and critical reading strategies in particular, motivation, and reading difficulties which entailed a positive effect on their academic achievement as well.

The present research is composed of four interconnected chapters. The first chapter scrutinizes the concept of ESP as a teaching/learning process, mainly in terms of theoretical perspectives and practical issues. As such, it investigates the identification of ESP and its components, and then compares them to those of General English for the sake of finding out differences and similarities between the two types of teaching English as a foreign language which may help the researcher to come close to the identification of the characteristic features of ESP which makes the focus of this study. It also discusses ESP course design and its related elements, namely: students' needs analysis, teaching goal and objectives, materials selection

and/or development, teaching methodology, besides course assessment and evaluation. This chapter also examines the Algerian ESP project with reference to its crucial issues and raising opportunities. For this, it highlights the lack of administrative interest, lack of professionally qualified ESP teachers, students' awareness of and motivation towards the ESP course, as well as the effectiveness of ESP instruction as the pertinent issues that need consideration in this project.

In chapter two, a large space is devoted for reviewing literature concerning the promotion of critical reading strategies among ESP students with reference to pertinent theoretical issues and pedagogical implications. This chapter starts with exploring reading as a multifaceted process in order to understand the nature of the reading activity. Then, it proceeds to discuss the shift from comprehension-based to critical reading in ESP to transcend the literal meaning of the scientific text which has become an inevitable requirement for ESP learners, especially in the 21st century higher education. After that, crucial issues and implications of promoting critical reading strategies in ESP are examined through giving an overview of language learning strategies in general and their development among ESP learners, besides exploring critical reading strategies taking into consideration their identification, classification, and measurements. The chapter, after that, moves on to highlight previous attempts to enhance language learners' critical reading in different learning contexts. This is followed by providing the rationale for promoting critical reading strategies among ESP learners with a particular focus on the Algerian ESP area. Finally, procedures for integrating critical reading strategies into ESP instruction are analytically depicted and explained.

Next, the third chapter is devoted to the description of the study context and discussion of the research methodology, the procedures of the data collection and analysis, in addition to the interpretation and discussion of the results. Relevant to this, the mixed methods experimental research design opted for in this study is thoroughly explained. The selection and development of the research instruments is also demonstrated here, besides the presentation of the population of the study, as well as the way data were gathered and analysed using the SPSS programme version23. The chapter ends with providing a detailed interpretation and exploration of the obtained findings, throughout the different stages of the experimental process, taking into consideration the research questions and the hypotheses set at the beginning of the study.

With reference to the results obtained, the last chapter of this work provides some suggestions and recommendations in order to help students promote their critical reading

abilities in the ESP classroom. For this, recommendations are first addressed to authorities and policy makers to rethink ESP teaching in the Algerian context through re-enhancing the Algerian ESP project, and fulfilling the need for a national university level ESP course that has to cope with 21st century higher education requirements, especially in terms of determining clear objectives of ESP teaching. In the same vein, policy makers are called to seriously take into consideration pre-service and in-service teacher training as well as encouraging interdisciplinary teacher collaboration. Furthermore, at the pedagogical level, administrators are recommended to change their usual policies and practices towards adopting a more critical approach to the teaching of ESP. Similarly, teachers and students are also addressed through highlighting the significant roles they can play in order to promote critical reading in the Algerian ESP context.

Chapter One

ESP Teaching/Learning: Theoretical Perspectives and Practical Issues

Introduction:

The most important objective underpinning the first chapter consists in highlighting one of the major keywords that sustains the construction of the present research, namely ESP as an extended branch of general ELT teaching. The focus is made particularly on ESP teaching/learning with specific reference to theoretical perspectives and practical issues featuring this kind of English teaching. Relevant to this, after elaborating on the emergence of ESP as a result of the shift from general to specific purpose perspectives of EFL teaching/learning, the chapter tries to explore the extent to which ESP can be specific through indentifying the concept of ESP and its components. Then, the relationship between ESP and EGP is analytically tackled to deduce that both concepts represent different sides of the same coin which is ELT.

Additionally, light is shed on the paradigm shift that results from the need to change from traditional to critical perspectives on teaching ESP. The latter's course design is also given room in this chapter through discussing its predominant key aspects and controversial issues like students' needs, conceptualization of teaching goals and objectives, and aspects of authenticity and specificity as characteristic features of ESP materials selection and /or development, among others.

Furthermore, since the present research deals with ESP in the Algerian context mainly, a large space in this chapter is devoted to rigorous reasoning on the Algerian ESP project, specifically in terms of its critical issues and raising opportunities. This part is treated thoroughly in order to provide a clear picture of the current situation of ESP teaching/learning in Algeria which may reinforce the theoretical dimension that supports the present research.

I.1. Contextualization of EFL: a Shift from General to Specific Purpose Perspective of Teaching/Learning

The widespread of English as a global language has had a considerable impact on the emergence of English language teaching as a great international enterprise. According to Broughton et al. (1980, p. 6), unlike English as a Second Language (ESL), English as a Foreign Language (EFL) is only taught in schools; it has nothing to do with the national or social life of the learners. Meanwhile, it is believed that people may learn a foreign language for two different motives: instrumental as in the case of tourists, salesmen or science students who need the foreign language to read books or communicate with speakers of that language while integratively motivated people generally choose to learn the foreign language trying to identify with the community of that language.

In fact, interest in studying foreign languages can be traced back to the mid 18th century- at least in Europe- during which period what is now known as the Grammar Translation Method was the dominant classroom approach. At that time emulating the teaching of classical languages was predominant as the main aim of most foreign language teaching in schools was typically literary focusing mainly on the study of grammar through the translation of literary passages from the foreign language to the mother tongue and vice versa (Howatt & Smith, 2014, p. 79).

Yet, as the Grammar Translation method proved defective in developing the oral skills, promoting the teaching of the spoken language became a vital pedagogical priority by the end of the 19th century since, as it was argued, speech is the primary foundation of all language activity (Ibid.). Thus, from 1880 till the 1920's, foreign language classroom instruction was based on what is known as the Reform Methods like the Natural Method, the Berlitz Method and the Direct Method. These were originated as a reaction to the Grammar Translation Method. For example, the Direct Method suggested that rules of grammar should be acquired inductively and the best method is "not to make the learner learn the rules themselves, but to provide direct practice in speaking and reading through imitation and repetition" (Els, T.V. et al., 1984, p. 184). Therefore, the focal point of the Reform Methods is "learning through habit-formation, which was brought about by imitation, reinforcement and repetition of behaviour" (Littlewood, 1984, p. 17).

However, though many scholars acknowledged that the Reform Methods were among the most effective methods in language teaching history, as they impose lasting changes and improvement, the use of translation has been favoured in different contexts even nowadays, especially in higher education. This is, perhaps, due to the shortest way provided by translation in learning and conveying new meaning in the foreign language.

Furthermore, after World War I, the pioneering contribution of Harold Palmer's experimental research paved the way for the appearance of what is often referred to as the Scientific Period (1920-1970) of foreign language teaching. That period was characterized by various teaching methods and approaches like the Situational Approach, the Oral Approach, and the Audiolingual Method, among others. The characteristic feature of research in that era was the integration of linguistic insights with the behaviourist psychology for the development of foreign language teaching methods and materials. This development was culminated in the introduction of language laboratories to reinforce "the use of drills and exercises aimed explicitly at the formation of [what was thought to be] correct habits in the production of grammatical structures"

(Howatt & Smith, 2014, p. 85). However, in spite of all these tremendous changes and developments foreign languages were still being learnt for their own sake rather than for any other purpose.

In fact, it was not until the Second World War that radical changes took place. According to Scott, C.T. (1965, p. 414), "the Second World War provided in a most dramatic way the first major impetus towards changing our mode of thinking concerning the study of foreign languages". It was this change in the way of thinking concerning the study of foreign languages that led to a shift in the traditional understanding of teaching English as a foreign language from emphasizing the development of knowledge about the language, as a means of improving learners' listening, speaking, reading and writing skills to "a contextualize notion of language" (Master & Brinton, 19898, p. 1, in Delicia, L. 'no year' p. 1) which is linked to a particular profession or discipline (Luo & Garner, 2017, p. 82), indeed, especially when the need for teaching English for Specific Purposes (ESP) was raised by the 1960's. It is often argued that the field of ESP has been gaining momentum ever since the English language emerged as the world's first language and linguistic studies shifted attention to the consideration of social contexts to deal with language as communication.

Nevertheless, according to reviewed literature the emergence of ESP was fostered by many factors among which commerce and technology that dominate the post war era 1945. This unprecedented domination raised the need for an international language to meet the increasing expansion in scientific, technical and economic activity on a world wide scale. Moreover, the appearance of the US as the first world power after WWII granted English the position of the language of international communication. Therefore, a new generation of learners was eager to learn the English language not for its own sake but rather for more accurate specific purposes. This, coupled with the importance given to learners and their attitudes towards learning thanks to studies in psychology, gave rise to a learner-centered approach and paved the way for the development of English for Specific Purposes (ESP) (Lesiak-Bielawska, 2015, p. 2).

According to Lesiak-Bielawska, the development of ESP can be described in terms of three chronological stages:

a. **The Register Analysis Phase (1962-1972):** During this early phase of ESP development, the focal point of research was English for science and technology (EST) in academic settings. The main objective of analysis was the depiction of how the language system manifested itself in different registers, e.g. in English of Electrical engineering as opposed to English of

Biology (Ibid.). It was based on counting grammatical features across genres, aiming at discovering and defining, both quantitatively and qualitatively, the general characteristics of EST at the level of the sentence (Badea, S. 2016, p. 125). According to Garcia Mayo (1998) this approach to language analysis failed to provide guidance for the choice of one grammatical item and its appropriateness for a given structure of a text (Lesiak-Bielawska, 2015, p. 4)

b. **Towards the Use of Rhetorical Devices (1972-1981):** The Development of ESP during this stage was marked by the influential contribution of Lackstrom J.E., Selinker, L., and Trimble L.P. (1972) with their *Grammar and Technical English* which paved the way to rhetorical or discourse analysis (Hatchinson & Waters, 2010). Following Bley-Vroman, R. (1978, p. 280, in Bielawska), the main objective of ESP rhetorical theory is the attempt "to establish a correspondence of purpose with device", with "device" signifying linguistic means employed by the author to achieve the desired end (Ibid).

c. **Introduction of Key ESP Concepts (1981-1990):** This period is mainly distinguished by J. Swales' *Aspects of Article Introductions* (1981) and *Genre Analysis* (1990). It is also marked by the expansion of ESP research. Thanks to J. Swales and A. Johns, the editors of ESPJ (English for Specific Purposes Journal), many articles were submitted, mainly dealing with needs analysis (NA), genre and rhetorical moves. These latter are still predominant key concepts in the ESP research field.

d. **Recent Developments (after 1990):** according to Lesiak-Bielawska (2015), recent developments of ESP are mainly characterized by the role of international journals, genres studies and corpus linguistics:

- *International journals*: from the American University of Washington, D.C. in 1981, Grace Burkhart established the ESP journal. The year 1992 witnessed the beginning of the Journal *Second Language Writing* which deals with second/foreign language writing without neglecting ESP-related issues. In 2001, the *Journal of English for Academic Purposes* was introduced to tackle aspects of needs analysis, teacher education, discourse analysis, corpus linguistics, acquisition studies in EAP contexts, etc. Then, 2002 marked the appearance of the first issue of *English for Specific Purposes World* which covers a wide range of ESP topics and issues.

- *Genre studies*: Swales's *Genre Analysis* (1990) initiated developments in the domain of genre studies. Moreover, under the influence of North American Scholars of rhetoric and composition studies, ESP researchers were pushed "to go beyond traditional text analysis and to relate form patterns to discourse communities, their goals, values and practices" (Lesiak-

Bielawska, 2015, p. 9). As such, textual and social contexts are integrated into genre analysis following the practical methodological procedures identified and depicted by Bhatia (1993). The latter investigated some of the important language teaching contexts, particularly ESP, where genre analysis can show certain issues in language teaching and enhance solutions (Badea, S. 2016, p. 127). In the same vein, Swales (1998) highlighted interaction between text and context while Hyland (2000) achieved a corpus-based approach to the investigation of academic genres (Ibid.). In 2008, Bhatia designed a framework for critical genre analysis, and in 2014 he, with Evangelisti Allori and Bateman marked one of the latest contributions in the field of genre analysis through the edition of *Evolution in Genre: Emergence, Variation, Multimodality*. Yet, all these researches reveal the undeniable role of genre analysis in language teaching studies in general and ESP in particular.

- *Corpus Linguistics*: the majority of research in this field focuses on the analysis of written academic genres. For instance, Hyland (2000) emphasizes the relationship between writers and readers of academic texts (Lesiak-Bielawska, 2015, p. 12). Moreover, Diane Belcher (2006) highlights the potential of corpus-based studies to supply a better "empirically based understanding of language used for specific purposes" (Badea, 2016, p. 127). Thus, the use of corpora in ESP teaching and learning "can range from providing examples that illustrate accepted language use, or are a starting point for gap-filling and matching exercises" (Lesiak-Bielawska, 2015, p. 14). Yet, according to Nesi (2013 in Ibid.), approaches to corpus work in relation to ESP teaching are changing in response to advances in technology in that "the more powerful corpus tools are, the more possible it is to gain access to larger corpora and discover more about language use in specific settings…the more complex and powerful tools are, the less accessible they become to students and teachers."

I.2. Towards an Identification of ESP and its Components: to What Extent Can ESP be Specific?

The tremendous amount of definitions that has been given to English for Specific Purposes (ESP) is still in growth with the growing importance of this field of EFL teaching. A too general definition can be the one of Mackay & Mountford (1978) in which ESP is used to refer to the context where English is taught to fulfill a predetermined utilitarian purpose (Bilokcuoglu, 2012, p. 80). In the same way, El Minyawi (1984) looked at ESP courses as being established on "the need to convey the ideas (of subjects) which students need to be able to read confidently and speak about them fluently afterwards" (Ibid.)

However, Hutchinson & Waters (1987) regarded ESP as an approach that focuses on the learner's need of the language rather than the language teaching material or methodology. They believed that the core of ESP is the learners' needs of a language that is required in particular learning contexts. As such, these researchers viewed ESP as "an approach to language teaching in which all decisions as to content and method are based on learners' reasons for learning" (Hutchinson & Waters, 1987, p. 19). So, here, the purpose why the learners are learning the language is the triggering component of English learning. In the same way, Schleppegrell, M. & Brenda considered ESP as being "built on an assessment of purposes and needs and the functions for which English is required" (1986, p. 7).

ESP is also defined by Johns & Machado (1991) as an approach to teaching English as a foreign language. This approach is learners-centered and it is designed to respond to adult learners' needs of learning a foreign language for their specialized domains whose courses framework should be based on the coming principles:

- Development of a needs assessment and genre analysis for specific groups of learners;
- Supply of guidelines to adopt and create authentic ESP materials in a chosen educational or professional field;
- Development of assessment procedures appropriate for ESP and apply this knowledge in developing course and lesson evaluation plan.
  (Maouche, 2012, Pp. 43-44)

In fact, the above mentioned principles are also highlighted by Robinson (1991) in her definition which stresses two key criteria. The latter are that "ESP is normally goal-directed and that ESP courses develop from a needs analysis, which aims to specify as closely as possible what exactly it is that students have to do through the medium of English" (in Rahman, 2015, p. 25).

On the other hand, some studies have tackled the issue of defining ESP from the perspective of considering its characteristics. In this respect, Strevens (1980) recognized ESP characteristics as follows:

- ESP consists of English language teaching designed to meet specific needs of the learners.
- It is related in content to particular disciplines, occupations and activities.
- It is in contrast with General English.
- It is not taught according to any pre-ordained method (Maouche, 2012, p. 46).

These characteristics were later developed by Dudley-Evans & St John whose definition of ESP is remarkably influenced by that of Strevens. Their definition includes three absolute characteristics and four variable characteristics as stated below:

- *Absolute characteristics*:
- ESP is designed to meet specific needs of the learner;
- ESP makes use of the underlying methodology and activities of the disciplines it serves;
- ESP is centered on the language (grammar, lexis, register) skills, discourse and genres appropriate to those activities.
- *Variable characteristics:*
- ESP may be related to or designed for specific purposes;
- ESP may use, in specific teaching situations, a different methodology from that of "General English";
- ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be used for learners at secondary school level;
- ESP is generally designed for intermediate or advanced students. Most ESP courses assume basic knowledge of the language system, but it can be used with beginners.
  (Ibid.)

Unlike the definitions set at the beginning, Dudley-Evans & St. John's definition, especially with the details it provides, seems more reliable in understanding what ESP is and what it is not.

A more recent definition of ESP is the one given by Rebecca Smoak (2003) which she considered as a summary of her ESP career. She asserts that "ESP is English instruction based on actual and immediate needs of learners who have to successfully perform real-life tasks unrelated to merely passing an English class or exam. ESP is needs based and tasks oriented" (Rebecca, 2003, p. 27). In addition to this, Rebecca confirms that her long investigation in ESP has brought her to the conclusion that:

- ESP is not teaching lists of technical vocabulary.
- Assumptions and intuition about language use in ESP situations are probably inaccurate.
- Needs analysis should include observations of the language use in context.
- Materials should be appropriate and authentic.   (Ibid.)

Despite the difference in time and space, all definitions of ESP presented here tend to share a common view in that ESP is based on learners' needs. Yet, Rebecca's definition is still the most

responsive to current world changes requirements as it brings ESP outside the classroom to meet real-life experiences. The latter can be either professional related to work place or academic like reading authentic scientific material as in the case of the present research.

I.3. ESP and EGP: Same Coin, Different Sides:

Generally, drawing distinctions between two concepts or more seems helpful in understanding them better; however, it is not the case when it comes to clarifying the difference between English for Specific Purposes (ESP) and English for General Purposes (EGP). The latter case has become a real challenge, especially in ESP contexts because teachers often wonder about the existence of major differences between ESP and EGP mainly in terms of, for example, what to teach (language or content), how to teach (methodology), what to consider in teaching (learners' needs, motivation, lacks …etc). In fact, while some researchers find no difference between the two concepts as both are representations of ELT (Hutchinson & Waters, 1987), others try to draw a line between ESP and EGP through deep analysis of both concepts (Dudley-Evans & St. John, 1998).

According to Widdowson (1983), the distinction between ESP and EGP lies in the way the learning purpose is defined and implemented as being quoted by Mountford (1983, p. 77):

> "In ESP 'purpose' refers to the eventual practical use to which the language will be put in achieving occupational and academic aims. As generally understood, it is essentially… a *training* concept: having established as precisely as possible what learners need the language for, one then designs a course which converges on the need. ESP … seeks to provide learners with restricted competence to enable them to cope with certain clearly defined tasks. These tasks constitute the specific purpose which the ESP course is designed to meet. GPE, on the other hand, … has to be conceived in *educational* terms … (and) seeks to provide learners with general capacity to cope with undefined eventualities in the future."

Furthermore, Widdowson's view of this distinction is shown in the next table:

ESP	EGP
1. Focus on training	1. Focus on education
2. Selection of appropriate content is easier (but note not easy in itself)	2. Course content is more difficult to select
3. The aim may only be to create a restricted English competence	3. It is important for the content to have a high surrender value

Table 1.1.: Widdowson's distinction of ESP and EGP (1983, in Mohseni, F. 2008, p. 4)

These differences do not appeal for a strict distinction between ESP and EGP rather than reveal the very features of each of them.

Moreover, for Brenda et al. (1986) the difference lies in "the learners and their purposes for learning English. ESP students are adults who already have some familiarity with English and are learning the language in order to communicate a set of professional skills and perform particular job-related functions" (1986, p. 7). Brenda et al. go further in clarifying the difference between ESP and EGP in that, for example, the latter stresses all four language skills equally (listening, speaking, reading and writing) while an ESP program might, for instance, focus the development of reading skills in students who are preparing for graduate work in engineering as in the case of the present study.

Nevertheless, Hutchinson et al. viewed the distinction between ESP and EGP as being "in theory nothing, in practice a great deal" (1987, p. 53). In fact, Hutchinson's statement is quite representative of the time when needs analysis practice was not all the rage as it is nowadays. Put another way, unlike the 80's where teachers were less conscious of the necessity of applying a needs analysis which would help them achieve their students' objectives, nowadays teachers are more aware of the importance of conducting a needs analysis procedure that enable them to select materials that fit the needs of their students.

This can also be interpreted in terms of the great extent EGP and ESP overlap. For this, Anthony (1998) supposes that the line which determines where GE courses stop and ESP courses start has become very vague indeed. Expressing the same attitude, Gordona, D. states:

> "As ESP and EGP have the same language system, the same methods and techniques can be used in teaching. Although investigations in the field of ESP learning and teaching predate EGP learning and teaching, the results achieved are valuable and it is not wrong to apply them to EGP learning

and teaching. Transfer in the opposite direction can also be useful” (2006: …..)

Yet, in spite of their remarkable overlap, there still room for clear differences between ESP and EGP as Gordona adds that each of ESP and EGP has its own aims and it is the word “purpose” that distinguishes both types of ELT through the analysis of learners' needs to determine learning aims and tasks.

Considering the Algerian context, it can be said that EGP is the English taught in middle and secondary schools. Here, where the different skills of the target language are taken into consideration equally and at the same time, the learners are expected to develop their knowledge of the language in order to pass an exam or a test by the end of the course rather than developing specific skills for professional purposes, for example.

On the other hand, ESP in the Algerian context is introduced mainly for advanced learners of English (adults), especially in higher education institutions as it is the case of the National High School for Hydraulics (the context of the present study). These learners have already been acquainted with EGP and are, now, supposed to learn ESP as their current situation requires them to develop specific skills in the target language for the sake of meeting the demands of an academic or professional situation.

Accordingly, it is highly noticeable that EGP and ESP should be considered as a continuum rather than a dichotomy in that EGP forms the basis of ESP. Put another way, EGP is the springboard for a more specialized English language course which is ESP. That is why it is highly required that learners pursuing an ESP course should reveal an acceptable level in general English.

In sum, ESP and EGP overlap in many ways but differ in the following points:

- Identification of learners' purposes of learning English;
- ESP learners are adults who are suppose to develop an already acquired knowledge of English in a more specialized way to be able to communicate a set of professional skills and to respond successfully to particular job-related situations;
- ESP program is based on needs analysis that determines which language skills are most needed by the learners;
- ESP focuses on language in context; i.e. language is taught with relation to a subject matter which is determined by students' field of interest;

- Being connected to a subject matter that interests the learners, ESP creates a meaningful context that is highly motivating for the learners;

- Content area knowledge; ESP focuses on a subject that is already known by the learners and concerns them;

- As it is based on learners' needs analysis, ESP reflects the learners' real world;

- Authenticity of materials is a must rather than a choice in the ESP context;

- ESP is a research-based approach to teaching English as it can never stick to a predetermined program; research, creativity and innovation make the cornerstone of a successful ESP course.

Eventually, it is clear that what makes the difference between EGP and ESP is not the language itself but the specific purpose of learning the language. As put by Brenda et al. "the 'specific' in ESP refers to the specific purpose for learning. Students approach the learning of English through a field that is already known and relevant to them." (1986, p. 8)

Further clarification of ESP can be achieved through the discussion of its types. In fact, ESP is basically divided into two prominent areas, namely English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). However, Carter (1983 in Bilokcuoglu, 2012, p. 82) proposes three types of ESP. These include English as a Restricted Language (ERL), English for Academic and Occupational Purposes (EAOP), and English with Specific Topics (EST). More details are given hereinafter:

1. *English as a Restricted Language*: For Carter (1983), this type is mainly used to communicate effectively in a very specific situation, for example the language used by air-hostesses whose repertoire "is strictly limited and can be accurately determined situationally." (Mackay & Mountford, 1978: 45 in ibid, p. 83). One feature of a restricted language is that it does not allow the development of the speaker's communicative competence to fit the requirements of new situations other than the vocational environment (ibid.)

2. *English for Academic and Occupational Purposes*: according to Carter, English for Academic and Occupational Purposes responds to professional and vocational purposes such as English for Business and Economics, and English for medical technicians or engineers.

3. *English with Specific Topics*: this last kind of ESP is viewed by Carter as being different from other types of ESP in terms of the focus that is put on the learners' probable future English needs, for instance science students needing English for postgraduate reading studies

or to be employed in foreign companies. However, it has been argued that this kind of ESP can be an integrated part in ESP lessons with stress on situational language that is determined by needs analysis of authentic language used in target work place environments (ibid.).

Unlike Carter, Hutchinson & Waters (1987, p. 19) divided ESP into:

1. English for Science and Technology (EST)
2. English for Business and Economics (EBE)
3. English for Social Studies (ESS)

Then, each of these ESP fields is further divided into: English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). With reference to the context of the present study, the type of ESP that should be highlighted here is that of English for Science and Technology (EST) which relates to the content area of hydraulics.

Hutchinson and waters' tree of ELT gives insightful details about the field of general English language teaching as well as its salient branches including ESP and its corresponding types also as it is revealed in the coming illustration.

English for Medical Studies · English for Technicians · English for Economics · English for Secretaries · English for Psychology · English for Teaching

English for Occupational Purposes (EOP)

EOP

EAP Courses often have a study skills component

EAP

EOP

English for Academic Purposes (EAP)

English for Business and Economics (EBE)

EOP is also known as EVP (English for Vocational Purposes) and VESL (Vocational English as a Second Language)

English for Social Sciences (ESS)

English for Science and Technology (EST)

English for Specific Purposes (ESP)

GE is usually studied for exam purposes

Adult · Tertiary (US High School) · Secondary · Primary

General English (GE)

various branches

English as a Mother Tongue (EMT)

English as a Foreign Language (EFL)

ESL can be divided in the same way as EFL

English as a Second Language (ESL)

English Language Teaching (ELT)

In American ELT the dominant branch is ESL.

Language Teaching

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Fig.1.1: The Tree of ELT (Hutchinson & Waters, 1987, p. 17)

Having drawn an insightful observation about the identification of ESP, its characteristics and types, one can assume that ESP is not a different variety of English, but it is a needs-based situational approach to language learning in which some specific purposes of language functions are emphasized in the ESP teaching process. The latter will be discussed hereinafter mainly with reference to traditional trends then the change towards critical perspectives on teaching ESP.

I.4. Paradigm Shift: the Need to Change from Traditional towards Critical Perspectives on Teaching ESP

Throughout its development, the teaching process of ESP has witnessed various trends that were remarkable in shaping its progress since its emergence. While describing the theoretical evolution of ESP, Lesiak-Bielawska makes reference to four chronological phases which include

register analysis phase which is followed by discourse analysis phase, then a third phase which witnessed the appearance of key ESP concepts like needs analysis , genre and rhetorical moves; the last and most recent phase include genre theory and corpus linguistics (2015, p. 1). From her part, Belcher describes recent trends in ESP practice in terms of three different but overlapping perspectives: the sociodiscoursal approach to ESP which is based on genre theory and genre-informed pedagogy; the sociocultural approach and its theories of situated learning; then the sociopolitical approach which supports theories and applications of critical pedagogy (Belcher, 2004, p. 165).

Nevertheless, the present research deals with trends in the ESP teaching process from two different yet complementary perspectives. The first perspective concerns traditional trends in ESP which include predominant theories that have characterized ESP since its emergence until the 1990's. The second perspective deals with the change towards critical approaches to teaching ESP.

In its early years, as Hyland highlights, ESP was rather concerned with identifying formal, quantifiable text features without consideration of social awareness (2007, p. 381). During these early years, the main concern of research was English for Science and Technology (EST) in academic contexts. It involves counting grammatical features across genres, e.g. Journal articles, aiming at finding out and identifying, both quantitatively and qualitatively, the general characteristics of EST at the level of the sentence (Badea, 2016, p. 125). This is generally referred to as register analysis as its purpose was to identify how the language system manifested itself in different registers (Lesiak-Bielawska, 2015, p. 3), e.g. in English of Hydraulics as opposed to English of Medicine. However, as remarked by Swales (1988, p. 59), this approach was purely descriptive and "had little explanatory force". For instance, as Lesiak-Bielawska posits, this approach "did not provide guidance as to when one grammatical form is more preferable to another" (2015, p. 4).

Therefore, by the 1970's a new approach, mainly influenced by Trimble, Selinker, Lackstrom, Huckin, Taron and Bley-Vroman (in Dudley-Evans & John, 1991, p. 300), was introduced paving the way for the appearance of the field of rhetorical or discourse analysis. The latter has shifted research interest to "the relationships between EST grammar and the author's rhetorical purposes" (Johns, 2013, p. 24, in ibid.). Accordingly, as Dudley-Evans & St John highlight, ESP specialist became more concerned with "identifying and weighing the importance

of features of the authentic language of the situations in which students will be using English" (1991, p. 299).

Moreover, the 1990's witnessed the publication of Swales' *Genre Analysis* which increased the popularity of genre as a key term in ESP research. As Belcher posits, genre analysis is "a tool of ESP, an engine for discovery and analysis of target text-types" (2004, p. 167). However, New Rhetoricians were more eager to go beyond the relationship between form and rhetorical situation or genre, to stress the necessity of immersion in the target situation reflecting in such a way Vygotsky and Leont'ev who emphasize the important roles of situated learning and scaffolding, or "legitimate peripheral participation" (Lave & Wenger, 1991 in ibid.), and this is what Belcher referred to as the sociocultural approach to ESP teaching or situated immersion pedagogy. The latter calls for different types of expertise infusion, for example, classes team-taught by ESP and subject-area specialists or instruction provided by dual-specialist professionals (Dudley-Evans & John, 1995; Feak & Reinhart, 2002; Artemeva & Logie, 2002, in ibid.).

In fact, some ESP programs stress more open "immersion" through moving closer to target situations by physically taking students to various field-related contexts or offering on-site classes in the workplace settings. The latter, obviously, becomes less emphasized by some specialists (Eggly, 2002; Gu, 2002) who support the use of technology through digitalized recordings that can be accessible by anyone at any time with an internet connection.

On the other hand, corpus linguistics which concerns the analysis of written academic genres has shown its potential in providing a better "empirically based understanding of language used for specific purposes" as Belcher claims (in Badea, 2016, p. 127). In this area of research, Hyland's contributions focus on the relationship between writers and readers of academic texts. Meanwhile, his publications on meta-discourse, "those aspects of text which explicitly refer to the organization of the discourse or the writer's stance towards either its content or the reader" (Hyland, 2005a, p. 109 in Lesiak-Bielaska, 2015, p. 12), are among the most influential. According to Lesiak-Bielawska (ibid, p. 13), "[w]hen complemented with genre analysis …, corpus linguistics will undoubtedly make important contribution to ESP research".

Yet, in spite of valuable contributions of language-based approaches to ESP research, the latter's theory and practice are to be questioned especially with the growth of a more socially informed approach. According to Hyland (2007, p. 382) "a social theoretical stance is needed to fully understand … [t]he values, beliefs, and ideologies of speakers and writers [which] are seen

in the distribution of particular features in texts and the ways texts are used , and are taken into account to understand and explain discourse practices". This, undoubtedly, would raise the need of change and pave the way to more critical perspectives on ESP teaching.

As a matter of fact, with the continuous growth of the present world, and in response to its inevitable changes and challenges, more critical approaches have been developed to understand the nature of the teaching/ learning process in different educational fields, and ESP is no exception. In fact, the modern unstable world has raised the need of a critical stance that calls for "a criticism of traditional education, a new understanding of the conception of knowledge, a new understanding of human nature, a democratic education, and the development of the whole person" (Darling & Nordenbo, 2002 in Yoshizawa, 20…, p. 21). These principles empowered a new perspective in education which is often referred to as Critical Pedagogy.

According to the literature, critical pedagogy has its origins in the work of the Brazilian educationist Paulo Freire deriving its principles from the critical theory of the Frankfurt School[1]. The latter's prominent thinkers (Adorno, Habermas, and Marcuse) believe in the idea of a just society that can be achieved only through emancipating oppressed people to be able to transform their life conditions (Aliakbari & Faraji, 2011, p. 77). This idea is, in fact, the starting point of critical pedagogy reflected mainly by Freire's[2] (1972) problem-posing model of education which is based on empowerment as a goal of education (Riasati & Mollaei, 2012, p. 223). An education that should go beyond the traditional transfer of information from teachers to learners who are often assumed as being empty vessels ready to be filled in with knowledge. Instead, education as Freire proposes, should aim at "developing critical thinking by presenting the people's situation to them as a problem so that they can discern, think about, and act on it" (Ibid).

As such, critical pedagogy can be viewed as an educational act that is based on constructing knowledge from a critical perspective. In this respect, Shor defines Critical pedagogy as:

> "Habits of thoughts, reading, writing, and speaking which go
> beneath surface meaning … to understand the deep meaning,
> root causes, social context, ideology, and personal

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[1] Critical theory is maily associated with the Frankfurt School (Institute for Social Research at the University of Frankfurt on Main), established in 1923. (for more insights see chapter II)

[2] Freire taught Brazilian and Chilian peasants how to read by introducing them to vocabularies that were meaningful to their daily experiences. Using words as stimulus, Freire engaged them in critical reflection on the oppressive realities around them, how they could free themselves from this oppression and transform their worlds. (Fajardo, 2015, p. 30)

consequences of any action, event, object, process, organization, experiences, text, subject matter, policy, mass media, or discourse." (Riasati & Mollaei, 2012, p. 224)

In the same way, Dewey (1910) focused on reflective thinking which "involves overcoming the inertia that inclines one to accept suggestions at their face value" (p. 13 in Zygmantas, 2009, p. 65). For Dewey, it is this type of thinking that should be fostered in the classroom. Likewise, Freire's (1970) problem-posing model of education, reinforced by creative thinking, has a direct influence on the construction of knowledge which is one prominent goal of education. The latter, according to Freire (1998), should be seen from a critical perspective as "the key to social transformation" in terms of economics, human relations, the right to employment, to education …etc (in ibid, p. 66). Nevertheless, as Zygmantas posits "in order to socially transform this world, first we must learn to read it critically"[3] because reading always implies a critical perception, allowing for interpreting and rewriting what was read (Freire, 1992:21 in ibid, p. 67).

Yet, as far as the language teaching field is concerned, Riasati & Mollaei believe in critical pedagogy as a teaching approach which attempts to help students question and challenge domination through raising their critical consciousness. For instance, as these writers add "the critical language educator relates knowledge of grammar and vocabulary to knowledge of social problems and how to act to solve these problems" (Riasati & Mollaei, 2012, p. 224). Consequently, in critical pedagogy "teachers are seen as researchers and knowledge workers who reflect on their professional needs and current understandings. […] [T]hey explore and attempt to interpret the learning processes that take place in their classrooms" (Kincheloe, 2008, p. 18 in Fenton-Smith, 2014, p. 24). Therefore, critical pedagogy "is required to manage the complex social system of the classroom and identify the need of individual students" (ibid, p. 225). This identification of individual students' need should be based on the ultimate goal of education which is "to develop the critical consciousness of the individual and the institution, and the community's responsibility for social change" (Giroux, 2007 in Fajardo, 2015, p. 33).

For her part, Fajardo investigates the factors that belated the practice of critical pedagogy in English language learning contexts which has been evident by the beginning of the 21st century through the introduction of such terms like "critical literacy" and other related concepts

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[3] For more insights on critical reading see chapter II

such as "critical language awareness", "critical reading", and "critical writing"[4] (ibid, p. 35). Among these factors as Crookes & Lahner (1998) point out "ESL/EFL teachers commonly see themselves as contributing to general welfare simply by helping people to communicate" (p. 320 in ibid, p. 36). Other factors like "ideology of pragmatism" and "discourse neutrality" are mainly emphasized by Benesch (2001, p. 370) and Pennycook (1997, p. 256) respectively, particularly in English for Academic Purposes (EAP) where the aim of the curricula is mainly "to enable students to successfully meet the academic expectations and standards set by the university" (ibid). Accordingly, in the EFL classroom, the focus is merely made on "who is talking to whom about what" (Akbari, 2008, p. 278 in ibid), rather than elucidating the complex issues facing both teachers and students.

In fact, in recent years more attention is drawn towards the consideration of critical pedagogy in the field of EFL teaching/learning, especially EAP. Perhaps, Benesch's proposal of a critical EAP (Benesch, 1993, 1996, 1996a, 1996b, 2001) is the best example to illustrate this tendency. Being influenced by many critical theorists (Paulo Freire, Michel Foucault, Katheleen Weiler, Carmen Luke, and Jennifer Gore), Benesch believes in adding a critical perspective to EAP to put limitations to EAP's unquestioned pragmatism. Critical EAP as Benesch posits:

> "Critical EAP, […] while retaining the aim of helping students navigate academic discourses and disciplines, challenges the notion of academic conventions as necessarily reasonable and non-negotiable. Instead, CEAP sees students as active agents, rather than novices or subordinates, who can be encouraged to question unreasonable requirements and collaborate with their instructors in developing appropriate curricula. " (2012: 1 in Fenton-Smith, 2014, p. 24)

Following this, the role of critical EAP teachers is:

> "[t]o observe ways students exercise and resist power, help students translate their resistance into action, suggest ways to refine their actions, and record the activities and discussions in their work as teachers/researchers. They do all this mindful of the relationship between flexibility and inflexibility in the institutions where they work" (ibid.)

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[4] More insights on these key concepts are provided in chapter two.

Eventually, while the traditional EAP teacher is assigned the mission of analyzing students' needs, designing or selecting teaching materials, and evaluating, the critical EAP teacher is required to deal not only with students' needs analysis to identify wants and lacks but even with their rights analysis to find out opportunities to change as it is explained in the coming section.

I.5. ESP Course Design: Key Aspects and Controversial Issues

With the widespread of the ESP field since the early 1960's, course design has become one of the crucial factors that affect ESP teaching. As stated by Hutchinson & Waters, course design is the process of interpreting the raw needs analysis data to produce "an integrated series of teaching learning experiences, whose ultimate aim is to lead the learners to a particular state of knowledge" (1987, p. 65). Yet, for Munby, ESP courses "are determined in all essentials by the prior analysis of the communication needs of the learners" (in Nurpahmi, S., 2016, p. 172).

Moreover, Dudley-Evans & S. John (1998, p. 121) described designing an ESP course as a set of phases. According to them, "the key stages in ESP are needs analysis, course (syllabus) design, materials selection (and production), teaching and learning, and evaluation. These are not separate, linearly-related activities; rather they represent phases which overlap and are interdependent" (in Salazar, 2017, p. 199). As such, it is clear that designing and putting into effect an ESP course is not an easy chore. The illustration below demonstrates the composite interaction of the various factors included in ESP course design following Hutchinson & Waters (1987, p. 22).
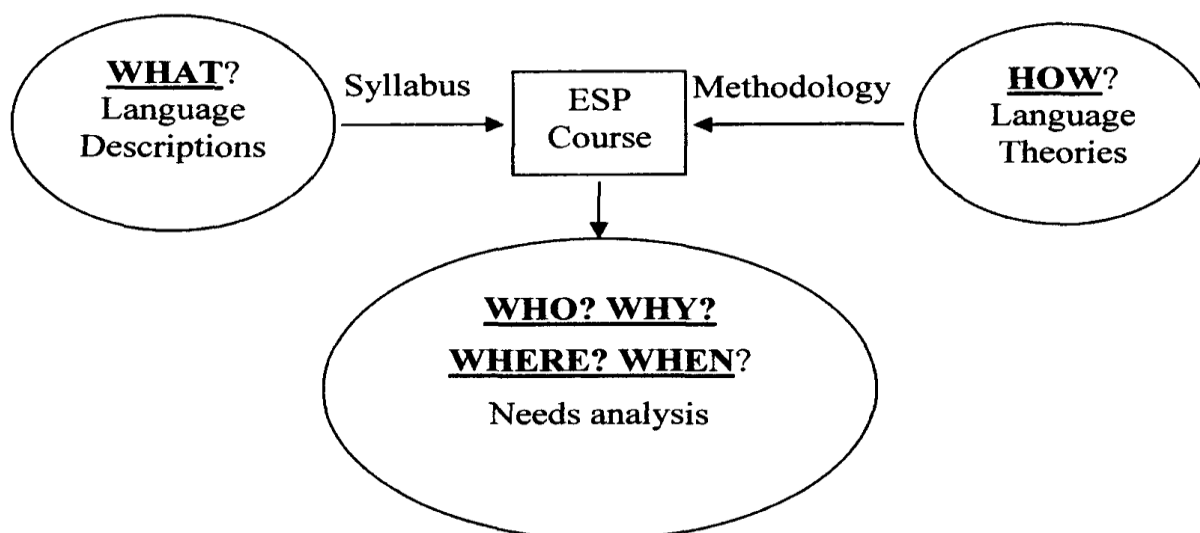
Fig.1.2. Different factors affecting ESP course design (Hutchinson & Waters, 1987, p. 22)

It can be assumed that course design is a series process that is composed of the following aspects: needs analysis, interpretation of needs analysis data to distinguish between relevant and useless information, conceptualization of teaching goals and objectives, materials selection and/or development, methodology, and course evaluation. Thus, as course designers, ESP teachers should be able to construct a particular sequence of learning experiences through which ESP students are gradually introduced to new concepts, ideas, strategies …etc. that can lead them towards the goals established at the beginning of the course. The flow chart below plainly represents the framework of course development processes.
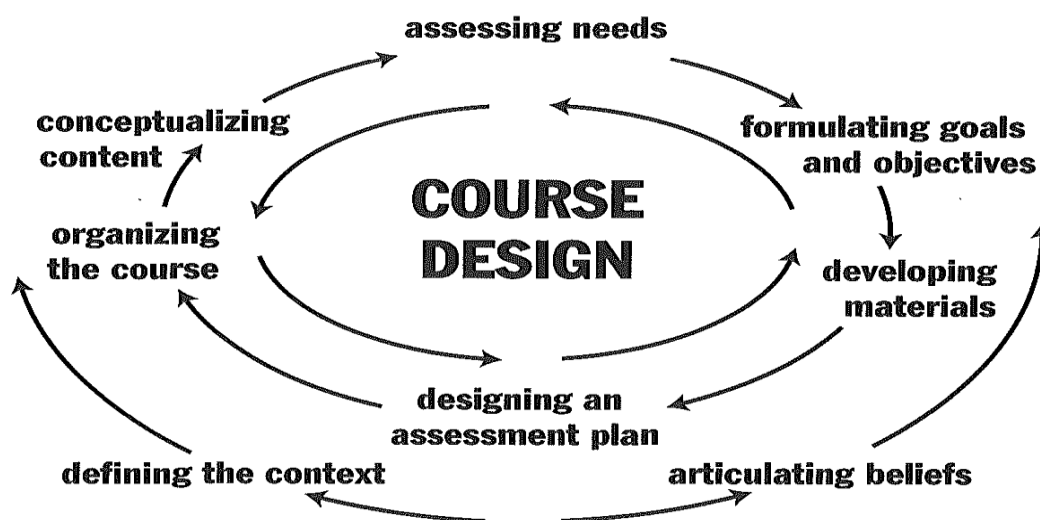
Fig.1.3. Framework of Course Development Processes (Graves, 2000, p. 03)

It is worth noting that the process of ESP course design should be rigorously based on the analysis of students' needs as it is put forward hereinafter.

I.5.1. The Premise of ESP Course Design: Students' Needs Analysis

As a term related to language teaching, needs analysis became popular in the 1970's and early 1980's due to the increasing popularity of ESP teaching at the time. For example, in 1978, in his original work "*Communicative Syllabus Design*", Munby announced Communication Needs Processor as the first most thorough and widely known model of procedures for discovering target situation needs. This approach to needs analysis identification was later developed by Hutchinson & Waters (1987) through extending the meaning of needs analysis from the target situation to the learning needs of the students. Relevant to this, needs might be classified into "target needs (i.e. what the learner needs to do in the target situation) and learning needs (i.e. what the learners need to do in order to learn)" (p. 54).

From his part, Allwright (1982) stresses the pivotal role of learners' wants and lacks in implementing language programs. According to Dickinson (1991):

> "needs are those skills which a learner perceives as being relevant to him; wants are subset of needs, those which a learner puts at a high priority given the time available; and the lack is the difference a learner perceives between his present competence in a particular skill and the competence he wishes to achieve" (in Jeczelewski, S., 2016, p. 10).

In such a way, needs analysis is considered as the driving factor in designing an ESP course. It is the cornerstone of more needs-focused program that really caters to students' demands, wants and lacks.

Following the definition of Dudley-Evans & S. John (1998), needs analysis is viewed as "the process of establishing the 'what' and 'how' of a course". According to the same authors, there are eight components of needs analysis that have been grouped into five broad areas including:

1. Target needs analysis and objective needs analysis (e.g. tasks and activities learners will use English for);
2. Linguistic analysis, discourse analysis , genre analysis, i.e. knowledge of how language and skills are used in the target situations;
3. Subjective needs analysis, i.e. learners wants, means, subjective needs-factors that affect the way they learn (e.g.: previous learning experiences, reasons for attending the course, expectations)
4. Present situation analysis for the purpose of identifying learners' current skills and language use;
5. Means analysis, i.e. information about the environment where the course will run. (In Otilia, S., 2015, p. 54)

In fact, these components characterize modern concept of needs analysis. At the beginning stages of ESP, needs analysis was limited to gathering information about the learners' attitudes, beliefs and opinions and the techniques of achieving specific teaching objectives. However, nowadays more comprehensive needs analysis may be conducted to collect information about all contextual factors, e.g.: learners, the target situation and environment of studying ESP.

Moreover, Belyaeva (2015, p. 77) identifies some types of needs analysis and approaches that can be singled out depending on the content and participants involved. These types include: target-situation, present situation, strategy analysis and means analysis.

1. Target situation: this seeks to determine the different situations where learners will have to use the English language. It focuses on the needs students have before the course starts and permits determining students' goals (Munby, 1978; Chambers, 1980; Martin, 2000)

2. Present situation analysis: the focal point of this analysis is students' language command prior to ESP instruction (Richterich & Chancerel, 1980)

3. Strategy analysis: this helps figure out students' preferred styles of learning and language acquisition in order to select the most appropriate teaching methods (Allwright, 1982)

4. Means analysis: this considers the availability of equipment, materials, and teaching staff for the ESP course (Holliday & Cooke, 1982; Swales, 1989)

From her part, Graves (2000, p. 100) elaborates on the process of needs assessment which involves as she posits "a set of decisions, actions, and reflections that are cyclical in nature:

1. Deciding which information to gather and why
2. Deciding the best way to gather it: when, how and from whom
3. Gathering the information
4. Interpreting the information
5. Acting on the information
6. Evaluating the effect and effectiveness of the action
7. (back to 1) deciding on further or new information to gather"

This process is better revealed in figure 1.3 below:
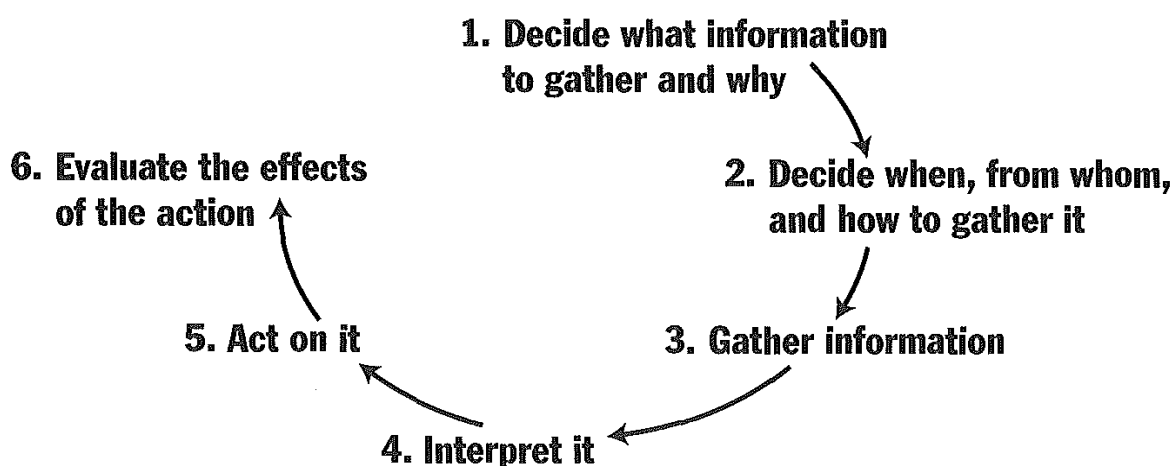
Figure.1.4. Needs assessment cycle (Graves, 2000, p.100)

Graves goes further in her elaboration of needs assessment through highlighting the main purpose of this crucial process in ESP course design. This purpose is well clarified in the coming illustration.

Purpose of course:

learners' abilities,   - - - - - - to make - - - - - - →   desired
attitudes, preferences   progress toward   abilities /change
before course   outcome

Purpose of needs assessment:

to gather information about   to gather information about

in order to make decisions about what will be taught,
how it will be taught, and how it will be evaluated.
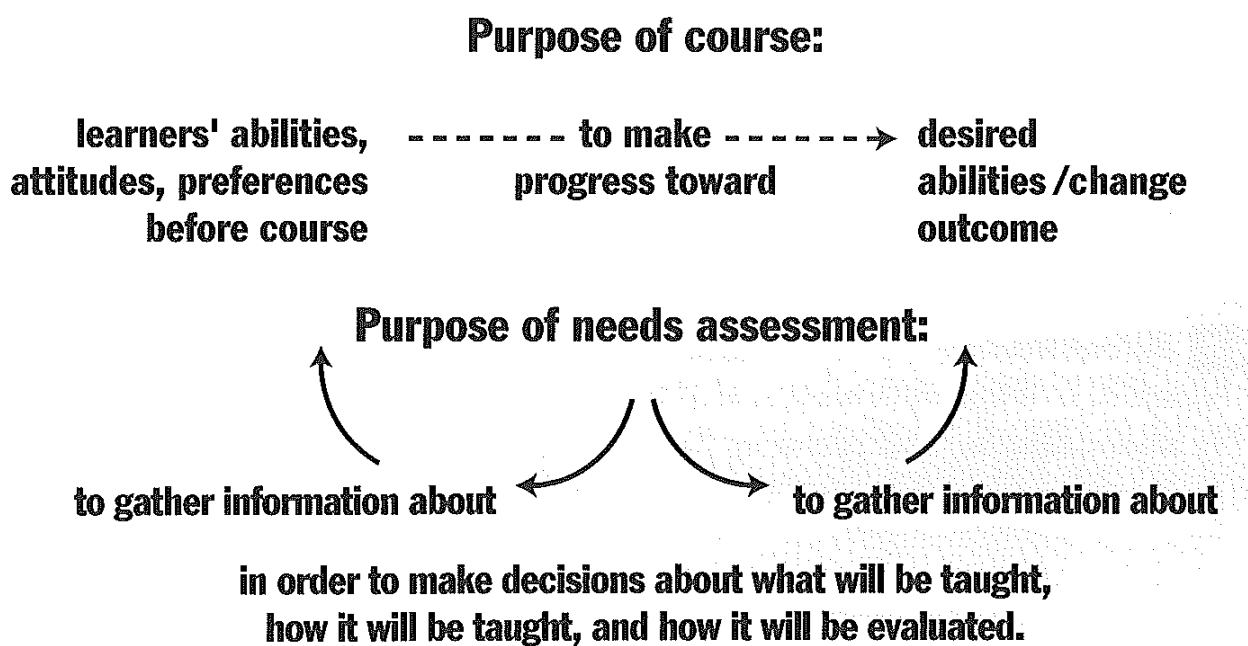
Figure.1.5. Basic purpose of needs assessment (ibid, p. 101)

All in all, analyzing the needs of the learners and subsequently establishing the goals and objectives of a class are the fundamental aspects of any effective course design (Hutchinson & Waters, 1987; Dudley-Evans & S. John, 1998; in Anthony, L., 2007, p. 4). Thus, being the starting point of course design, needs analysis underpins a diagnosis of language learning behavior that should be realized before carrying out and developing the teaching plan. It can also supply some certain ground for teaching material collection and/or production, and therefore enhancing students' interest through making teaching material more suitable for the requirement of the learning objectives. In fact, as White (1998) maintains, needs analysis is an "on-going process" that should not be considered only as a pre-stage for the design of language course, but as evaluation it can be used to design, improve and implement language programs. Once learners needs analysis is completed an ESP course can be designed accordingly.

I.5.2. Approaches to ESP Course Design: Speculation from the What-Know to the How-Know:

Theoretically, designing an ESP course may not seem too complicated as ESP students' needs are analyzed and their objectives are well defined from the very beginning. The reality is

different, indeed, what makes course design one of the greatest challenges facing the ESP practitioner. According to Carver (1983) an ESP course should be based on three principle elements:

a) *Authentic materials*: the use of authentic learning materials, at an intermediate or advanced level, is common in ESP, especially in self-directed studies or research tasks. The students are usually encouraged to conduct research using a variety of different resources including the Internet.

b) *Purpose-related orientation*: refers to the simulation of communicative tasks required by the target situation. The teacher can give students different tasks, e.g. to simulate the conference preparation, involving the preparation of papers, reading, note-taking and writing.

c) *Self-direction*: means that ESP is concerned with turning learners into active users. Here, the teacher should encourage the students to have a certain degree of autonomy, freedom to decide when, what and how they will study. (in Ahmed, 2014, Pp. 52-53)

Meanwhile, scholars and researchers focus upon knowledge of different approaches to course design to provide a solid basis for their ESP courses. In this vein, Hutchinson & Waters (1987) identify three predominant approaches which are still gaining momentum in the area of ESP course design:

I.5.2.1. Language-Centered Approach:

It is considered as the simplest approach to course design as it relies on connecting in a very logical way the content of the ESP course and the analysis of the target situation. Its purpose is to put the ESP learners as much as possible in a real situation. For example, for the students of journalism, a language-centered ESP course would include teaching English for interviewing, covering sport events or breaking news.

Following Hutchinson & Waters (1987, p. 66), the process of this approach should start by simultaneously identifying learners' target situation needs and selecting theoretical perspectives about the language in order to define the linguistic characteristics of the target situation. The next step is the creation of syllabus content which is followed by development or selection of teaching materials. The last step in this approach is the evaluation of the acquisition of syllabus items. A language-centered approach to course design proceeds as shown next:
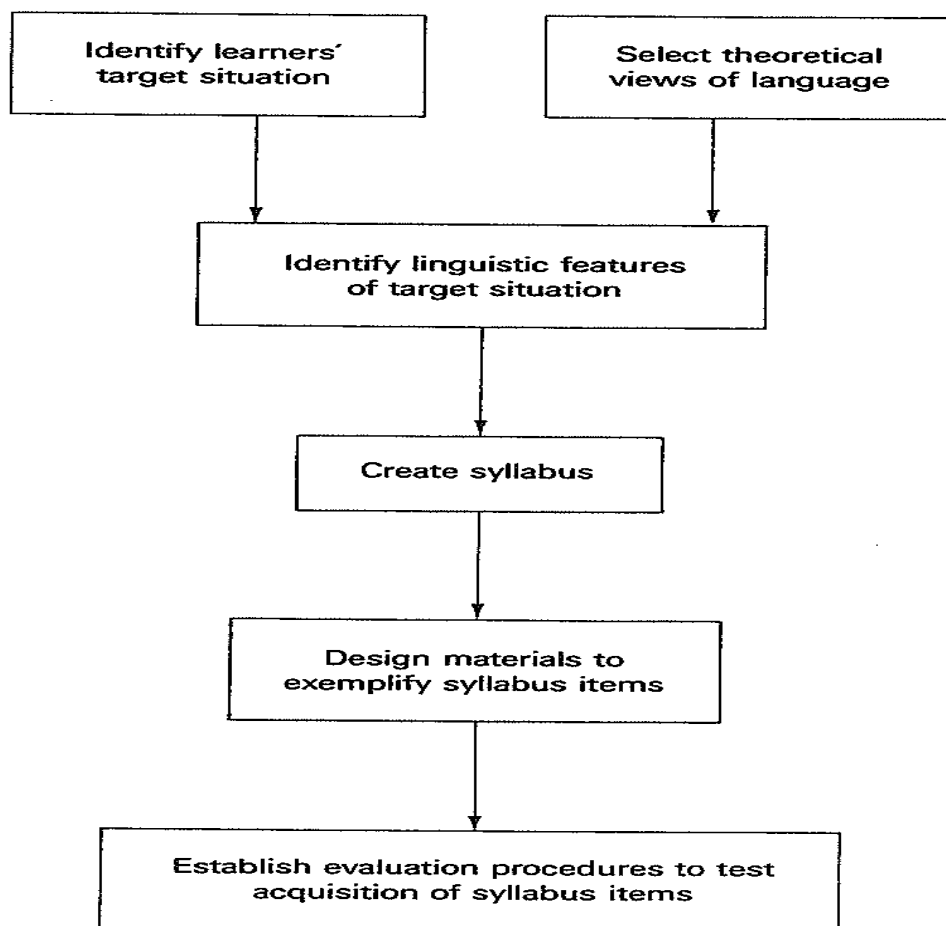
Figure.1.6. A language-centered approach to course design (ibid.)

Nevertheless, language-centered course design has proved defective for being a straightforward process which neglects students' state of knowledge and individual skills. In that, all students are treated in the same way and they are all expected to learn at the same pace. Basturkmen (2010, p. 59) criticizes language-centered approach of producing systematic learning in the learner by being based on the systematic analysis and presentation of linguistic data characterizing a certain type of specialized discourse (in Guerid & Mami, 2016, p. 03). This approach is also blamed for being inflexible because it views learning as an uncomplicated process.

Hutchinson & Waters (1987, p. 66) point out the shortcomings of language-centered approach as follows:

- The learning needs of students are not accounted for at all. It is therefore not learner centered but simply learner restricted.

- This language-centered approach is a static and inflexible procedure which contradicts with the nature of needs analysis which is an ongoing process and authentic one that should never be static.
- The language-centered model gives no acknowledgment to factors playing part in the creation of the course like the types of texts chosen to be included in the course for example. These texts may be boring to students.

I.5.2.2. Learning-Centered Approach:

This approach is also known as the learner centered approach. The term learning is more useful to describe the approach than learner since the latter is only one factor among others (teacher, school, institution …etc.) taking part in the process of this type of course design. Moreover, the quality of information delivered to the students is the characteristic feature of this approach. In the latter, and according to Hutchinson & Waters, learning is viewed as "a process in which the learners use what knowledge or skills they have in order to make sense of the flow of new information. Learning, therefore, is an internal process, which is crucially dependent upon the knowledge the learners already have and their ability and motivation to use it" (ibid, p. 72).

Considering Hutchinson & Waters' definition, it can be deduced that through the process of constructing a learning-centered course, the teacher plays a vital role in making decisions concerning the structure of the course which is composed of a set of readings, assignments or tests that should foster the procedure of acquiring knowledge and achieving established goals simultaneously. Yet, what is perhaps particular to this approach is that after setting necessary requirements of the course, the balance of control gradually shifts from the teacher to the students. Now, the teacher is supposed to play the role of a mentor or coach rather than being the focal point in the process of conveying information.

In such a way, it is obvious that the learning-centered approach considers the learning throughout the whole process of preparing and delivering the course. Therefore, the learner plays a remarkable role in analyzing the learning situation, writing the syllabus and selecting the teaching materials. He is also taken into account during teaching and evaluating learning achievements. Thus, this approach views the learner as an active agent in shaping and determining course design, the fact which makes it considerably different from the language-centered approach.

The diagram below illustrates clearly the process of the learning-centered course design.
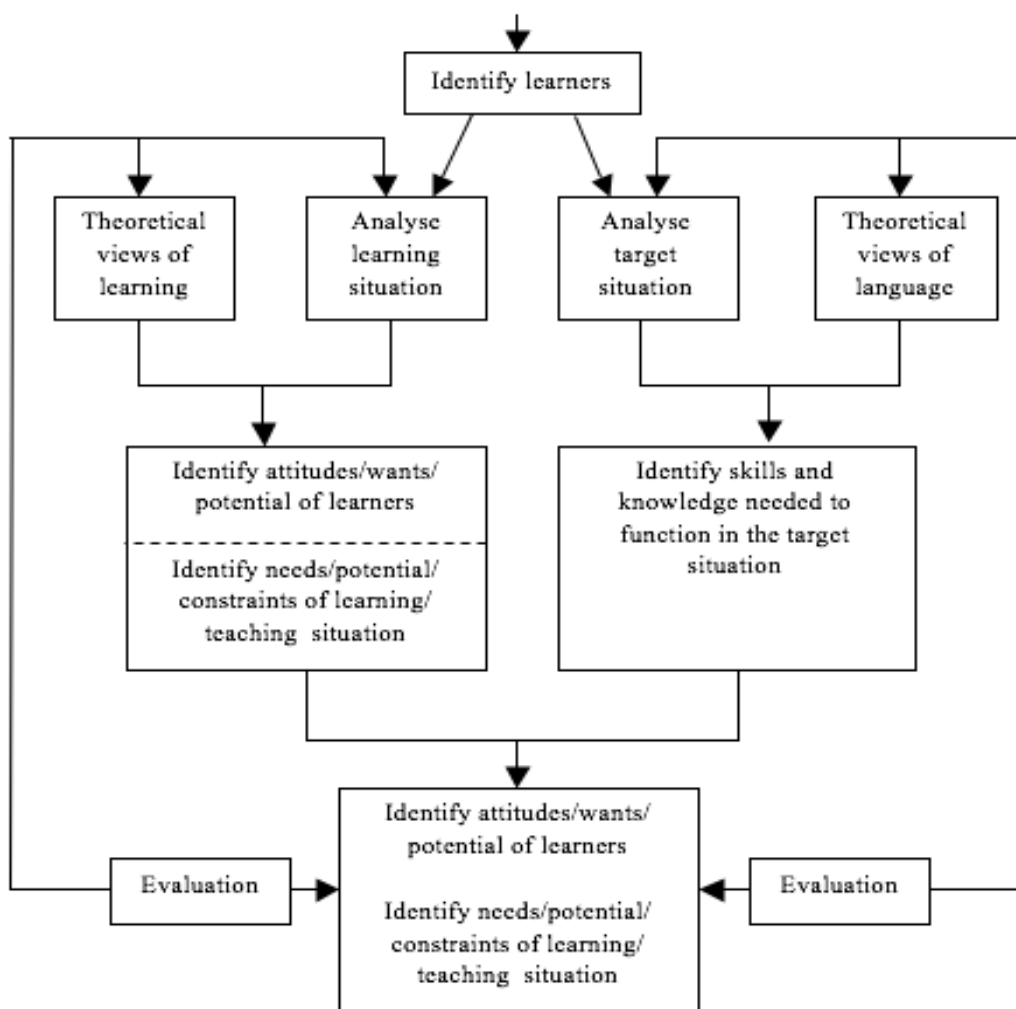
Figure.1.7. A learning-centered approach to course design (ibid, p. 74)

Theoretically, the learning-centered course seems attractive and promising, yet practically teachers have to be cautious. Teachers pursuing this type of courses have to know that the balance of control should be set up taking into consideration the maturity and skills of the students as the latter are always in need for a certain degree of control. In addition, the learning-centered approach can be applied with highly skilled learners as it involves the practice of critical and creative thinking, problem solving and decision making, especially when it requires the students to reflect on and monitor their thinking as they make decisions and take action. These metacognitive skills that the majority of our students lack would create a serious obstacle in designing and implementing such kind of course. Thus, developing students' learning skills and strategies is a prerequisite step before designing a learning-centered course.

I.5.2.3. Skills-Centered Approach:

As opposed to the language-centered approach, skills-centered approach aims to avoid the surface performance data and looks closely at the competence that underpins performance. As such, a skills-centered course should identify its learning objectives in terms of both performance and competence as confirmed by Hutchinson & Waters "a skills-centered course will present its objectives (though probably not explicitly) in terms of both performance and competence." (ibid, p. 69). According to Belyaeva, "skills-based course deals with teaching basic language competencies such as reading, writing, listening, and speaking. It can help teach students use English to prepare oral and written reports."(2015, p. 78). Thus, this approach considers the learner as a user of language rather than a learner of language. This is generally referred to as the theoretical principle of skills-centered course; the other principle has a pragmatic foundation.

The pragmatic principle is derived from Widdowson's (1981) distinction between goal oriented courses ad process oriented courses. From his part, Holmes (1982) identifies practical constraints on learning that are imposed by limited time and resources. He points out:

> "[I]n ESP the main problem is usually one of time available and student experience. First, the aims may be defined in terms of what is desirable, i.e. to be able to read in the literature of the students' specialism, but there may be nowhere near enough time to reach this aim during the period of the course. Secondly, the students may be in their first year of studies with little experience of their specialism." (In Guerid & Mami, 2016, p. 04)
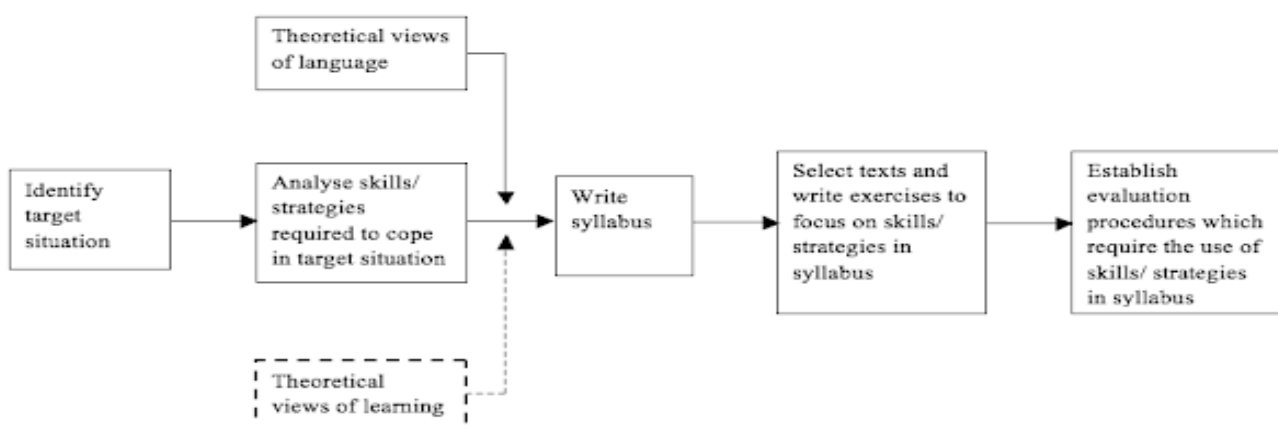
Figure.1.8. A skills-centered approach to course design (Hutchinson & Waters, 1987, p. 71)

Therefore, the emphasis in ESP course should not be limited to achieving a particular set of goals, but on helping the students to realize what they are able to do within the given constraints. Relevant to this, the skills-centered course design tries to enhance students' skills that can be useful even beyond the ESP classroom. It is based on discovering, analyzing and sharpening students' learning strategies that enable them to effectively perform in the target situation. Thus, it as well follows a specific procedure.

This procedure begins by identifying the learners' target situation and then choosing theoretical views of language to determine the linguistic features that the learners need. The next step is setting the syllabus content, then selecting texts and writing exercises focusing on the skills and strategies of the syllabus. Eventually, this course ends with establishing evaluation procedures based on the skills and strategies required in the syllabus.

It is obvious that unlike the language-centered approach, the skills-centered approach concentrates more on the learner and his participation in building the course from the start. Yet, it is criticized of giving more attention to the side of language use. In that, as Hutchinson & Waters (1987, p. 70) state "in spite of its concern for the learner, the skills-centered approach still approaches the learner as a user of language rather than as a learner of language. The processes it is concerned with are the processes of language use not of language learning."

In fact, each approach has its weaknesses and strengths. For this, Nurpahmi (2016) suggests an integrated approach to ESP course design which is based on the principle that learners must be guided by their teacher in the learning process to learn optimally. The integrated approach stands for the incorporation of three components of need analysis: present situation analysis (PSA), target situation analysis (TSA), and learning situation analysis (LSA) to collect data from: learners, teachers, stakeholders and experts. The next step is creation of syllabus through integrating more than two kinds of syllabus, then developing material taking into consideration both content material and functional language. According to Nurpahmi, the teacher plays a key role to facilitate learners to learn; yet, both teachers and learners are the main factor determining the failure or success of the teaching process. However, similar to other approaches, evaluation is the final part in Nurpahmi's integrated approach to ESP course design as illustrated next:
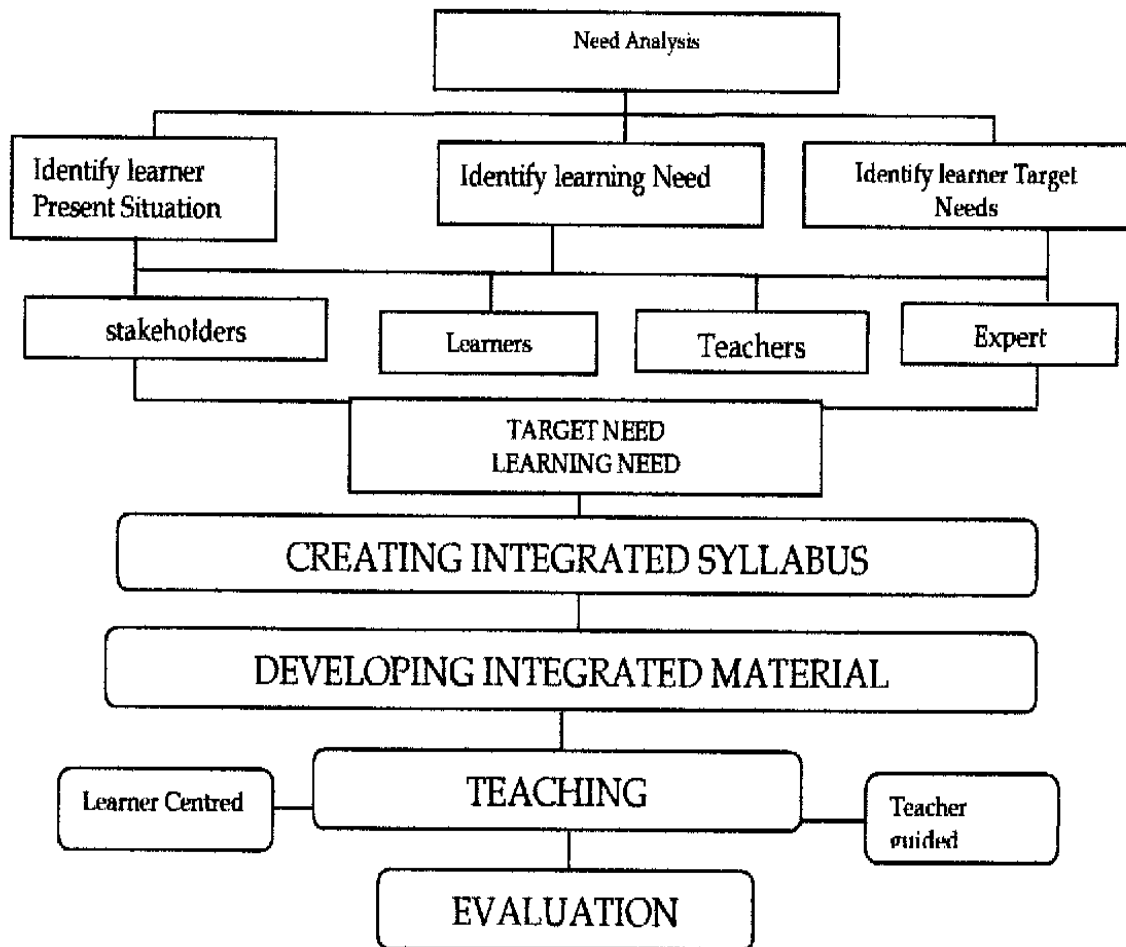
Figure.1.9. An integrated approach to ESP course design (Nurpahmi, 2016, p. 180)

I.5.3. Conceptualization of Teaching Goals and Objectives in the ESP Course:

The conceptualization of teaching goals and objectives is one of the most fundamental elements underpinning the ESP course after conducting needs analysis. The latter, in fact, is an undeniable prerequisite to the determination of language learning objectives as goals and objectives should be derived from the outcomes of needs analysis (Hutchinson & Waters, 1987; Brindley, 1989). Yet, clearly stated goals and objectives are essential in the ESP teaching process.

However, one should be cautious for the use of the terms "goals" and "objectives" that has often been confusing. In an attempt to draw the distinction between these two terms in course design, Hedge (2000, p. 344) considers the difference between both terms as "a distinction between the general and the specific." Accordingly, several objectives can be derived from a general goal of a given course and set up to be realized by the end of this course. Following the same author, broader goals are often set out by policy makers while specific objectives are left to be determined by teachers (ibid.)

Following Richards & Rodgers (1986, p. 20), discrimination is made between product-oriented and process-oriented objectives as they claim that "process-oriented objectives may be offered in contrast to the linguistically oriented or product-oriented objectives of more traditional methods". From his part, Nunan (2004: 45) posits that "goals can be socio-cultural, process-oriented or cultural, as well as communicative". Nunan's classification of goals, which is adapted from Clarck (1987), is explained in the table below:

Goal type	Example
Communicative	establish and maintain interpersonal relations and through this to exchange information, ideas, opinions, attitudes and feelings and to get things done
Socio-cultural	Have some understanding of the very day life patterns of their contemporary age group in the target language speech community; this will cover their life at home, at school and at leisure
Learning-how-to-learn	To negotiate and plan their work over a certain time span, and learn how to set themselves realistic objectives and how to devise the means to attain them
Language and cultural awareness	To have some understanding of the systematic nature of language and the way it works.

Table1.2: Classification of course goals (ibid, adapted from Clarck, 1987, Pp. 227-32)

In the same vein, Graves (2000) views goals as general statements that express the main purposes and intended outcomes of a course. They bring into focus teachers' visions and priorities that can help them stay on the course. The same author asserts that goals should be directed to what can be actually achievable within the resources and constraints of the course, i.e. "who the students are, their level, the amount of time available, the materials available" (ibid: 75). Put another way, goals are "what the students should be able to do when they leave the program" (Brown, 1995, p. 71, in ibid).

On the other hand, objectives are more specific learnable and teachable units that can be derived from a given goal. Thus, every general goal may be broken into multiple specific objectives as indicated below:
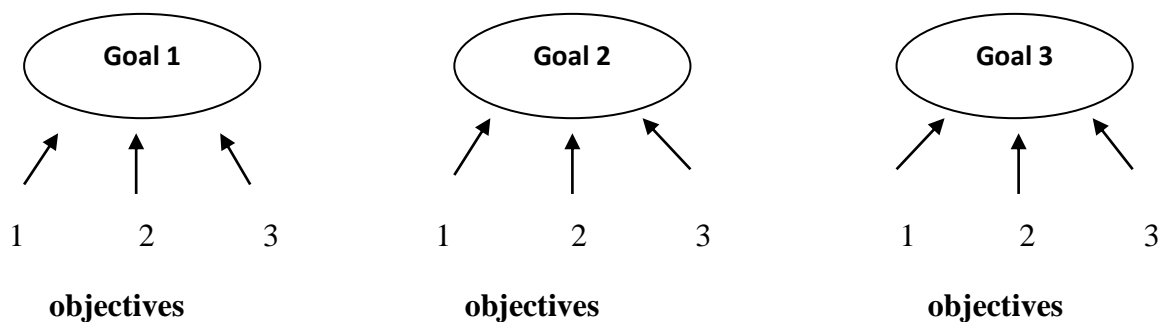
Figure.1.10: For every general goal there are multiple specific objectives (ibid, p. 77)

Meanwhile, a learning objective should address particular students' performance through linking their expectations with teaching and evaluation. As such, objectives have to be measurable and achievable, so that the goals can be reached. Graves describes the link between a goal and its objectives as a cause / effect relationship:

If these objectives are achieved   then this goal will be reached
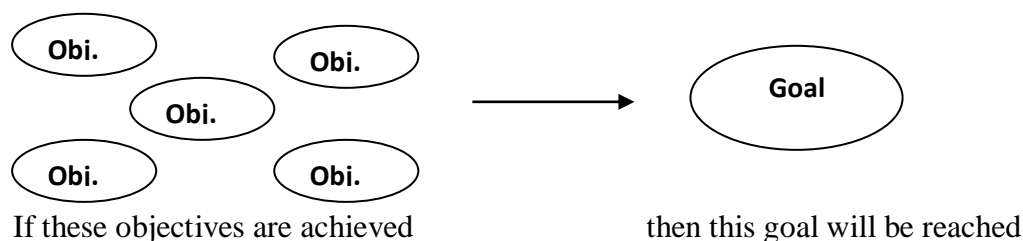
Figure.1.11: Cause and Effect Relationship between Goals and Objectives (ibid.)

Additionally, being inspired by the Bloom Taxonomy[5], Stern (1983) makes distinction between four types of objectives in language education: *proficiency*, *knowledge*, *affective*, and *transfer*. These objectives are identified as follows:

Objective	Identification
Proficiency	- As the first and major objective it implies the mastery of skills such as reading, writing, listening and speaking
Knowledge	- Explicit knowledge of linguistic and cultural information of the target language
Affective	- Development of positive feelings and attitudes towards the subject of the study

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[5] This refers to the initiative of the American educationist Bloom in setting an ordered classification or 'taxonomy' of educational objectives which are based on three psychological categories namely : cognition, affect, and psyhomotor skills. Stern (1983 :438)

Transfer	- The possibility of learning a particular language with the purpose of generalizing beyond the language in question

Table1.3: Stern's objectives in language education

As far as ESP is concerned, many researchers regard that ESP course goals should be based on developing learners' communicative competence. For instance, Chen (2010) asserts that communicative goals ought to be the prime concern of ESP courses. For him, the communicative goal responds effectively to the ESP learners' needs since they are expected to use English in real situations. Moreover, though in most recent teaching methodologies objectives are based on the process rather than the product of learning, both processes should be given equal importance. Therefore, ESP objectives have to address not only the process of learning, i.e. how to learn, but even the product of learning, i.e. what to learn; hence, the development of learners' declarative as well as procedural knowledge. For example, performing well in critical reading in a given domain of specialization (declarative knowledge) requires ESP students learning the strategies of reading critically (procedural knowledge).

In addition to the communicative approach, the ESP teacher can rely on the ABCD method of writing clear and measurable objectives (Heinrich, et al., 1996). In this method, "A" stands for audience, "B" is for behavior, "C" for conditions and "D" for degree of mastery needed.

- Audience (A): who? Who are your learners?
- Behaviour (B): what? What do you expect them to be able to do?
- Conditions (C): how? Under what circumstances or context will the learning occur? What will the student be given or already be expected to know to accomplish the learning.
- Degree (D): how much? How much will be accomplished, how well the behaviour need to be performed, and to what level? (ibid.)

Based on audience, behaviour, conditions and degree of mastery determined of each objective, the ESP practitioners can decide what types of task, assignments and assessment tools better fit their classrooms. In the same way teachers can select or develop authentic materials that should be used in the course.

From her part, and with reference to Stern's objectives, Basturkmen (2006) distinguishes five objectives in ESP teaching which can be explained as follows:

a. *To reveal subject-specialist language use*: this objective aims at showing to learners how English is used in the target setting or environment.

b. *To develop target performance competences*: this mainly concerns what learners do with the language and their mastery of the needed skills to be competent. As added by Basturkmen "this orientation can be categorized as proficiency objective, according to Stern's classification" (ibid, p. 135)

c. *To teach underlying knowledge*: this objective revolves around promoting learners' knowledge in arenas of study or work besides their language skills. In other words, this objective focuses on teaching subject content alongside language. Moreover, this objective can be sorted out as "a cultural knowledge objective, according to Stern's categorization" (ibid, p. 137)

d. *To develop strategic competence*: this type of objective promotes successful and effective interactive communication since it is based on "the link between context of situation and language knowledge" (ibid, p. 139)

e. *To foster critical awareness*: Basturkmen links this objective to Stern's knowledge and affective objectives. It intends to enable the learners' conscious and cultural awareness of the target situation.

What is noteworthy is that Basturkmen's objectives which are meant for ESP context expeditiously reflect Stern's objectives set for general language education. Yet, in both cases deciding on appropriate teaching methods and materials is of paramount importance in fulfilling any course objectives.

I.5.4. ESP Materials Selection and/or Development: Aspects of Authenticity and Specificity:

In language teaching materials are often referred to as:

> "[A]nything which can be used to help to teach language learners. Materials can be found in the form of a textbook, a workbook, a cassette, a C-D Rom, a video, a photocopied handout, a newspaper, a paragraph written on a whiteboard: anything which presents or informs about the language being learnt." (Tomlinson, 1998, in Valle, 2010, p. 142)

Following the above definition, materials are viewed as all means that can be employed by teachers or learners to facilitate the process of language learning through stimulating and

supporting language instruction. Moreover, Graves (1996) claims that teaching materials are means which can be figuratively cut up into component pieces and then rearranged to suit the needs, abilities, and interests of the students in the course.

On the other hand, materials selection and/or development is the process by which the course goals and objectives are put into effect through creating and planning units and lessons as argued by Graves "for a teacher, materials development means creating, choosing or developing, and organizing materials and activities so that students can achieve the objectives that will help them reach the goals of the course" (2000, p. 150). In such a process, a language teacher may have complete responsibility in developing the materials of the course, or least responsibility and decision making mainly in case of being asked to adhere to a given textbook. For this, Hyland (2006) argues that teachers may not always have freedom to choose what their courses will include and may find their syllabus handed to them by administrators or prescribed in set texts (in Rodrigo, 2007, p. 106). Yet, in both cases, teachers' creativity should always be given room through putting into use what they learned from experience (Graves, 2000, p. 149).

As far as ESP context is concerned, selecting and/or developing appropriate language teaching materials for ESP class is an inevitable element of its practice. As set by Hutchinson & Waters (1987):

> "Materials help organize the teaching-learning process, by providing a path through the complex mass of the language to be learnt. Good materials should, therefore, provide a clear and coherent unit structure which will guide teacher and learner through various activities in such a way as to maximize chances of learning" (p. 107)

In addition, the process of materials selection in ESP should be based on the undermentioned tasks: materials evaluation, materials development, and materials adaptation. These tasks are supposed to be realized by professional specialists often teachers with considerable experience in ESP teaching.

Following the same authors, materials evaluation is based on selection from available materials that relate to the students' needs. In this process, the effectiveness of ready-made materials designed by ESP specialists is revised by teachers through collecting information from students' attitudes towards these teaching materials. Moreover, materials evaluation can be realized by means of four main steps which are: criteria definition, analysis, selection, and implementation. Criteria definition seeks information about: who are the audience, the aim of

materials used, the content selected, and the methodology followed. The step of analysis examines the already designed materials in terms advantages and disadvantages. The results of this step should guide the teacher to decide or select which materials can best respond to learner's needs. In the last step the selected materials are implemented in the classroom reflecting the real world as much as possible (ibid.)

Nevertheless, when commercial materials are not available or do not match learner' needs, the ESP teacher can design his own materials from scratch. In fact, developing own material is often costing and time consuming. However, according to the aforementioned authors, teachers may rely on adaptation of existing materials through adding or deleting some items to better fit the learners' needs. In addition to adding and deleting, teachers can use other ways of adaptation like supplementing, editing, expanding, personalizing, simplifying, modernizing, localizing or modifying (Madson & Bowen, 1978). As such, the resulting materials should enable the learner to respond positively and be active throughout the learning process.

Furthermore, the process of ESP materials development for Valle (2010) entails reviewing, evaluating, and then selecting available materials taking into consideration different criteria and with reference to a particular ESP course. Valle regards materials development as an ongoing process where "those engaged in creating or adapting materials will be required to pilot test or perform evaluative reviews so as to adjust materials over time in response to implementation outcomes, current trends in the field or research findings" (2010, p. 144). This is a good practice, indeed, since "materials that undergo this evaluative review and revision process are likely to serve student and teacher audiences more effectively than materials that do not" (Stoller, et al., 2006, p. 175, in ibid). Eventually, as pointed out by Valle, materials development is a matter of trial and error. Figure1.12. clearly illustrates the planning process of materials development as conceptualized by Valle:
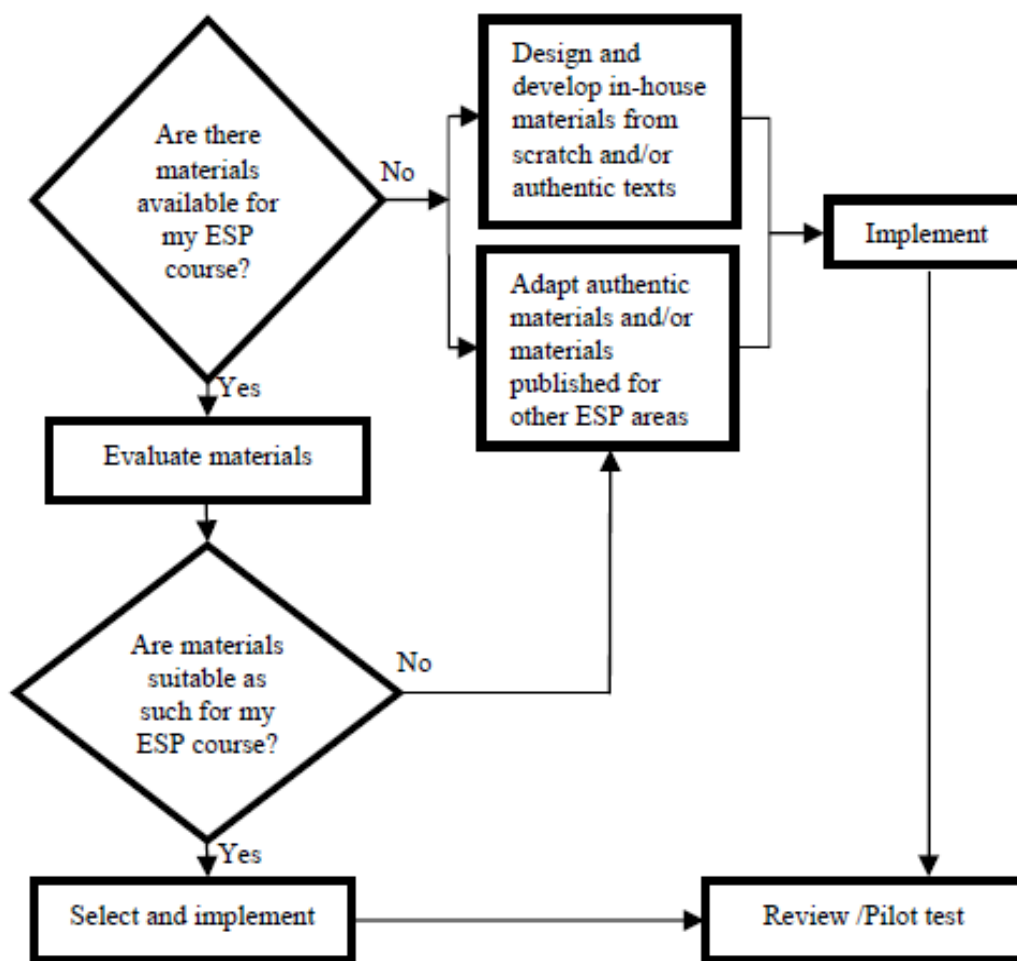
Figure.1.12. Flowchart on the process of materials development (ibid, p. 145)

On the other hand, the process of materials selection and/or development is subject to two fundamental aspects which have to be taken into consideration by any materials designer: authenticity and specificity.

- *Authenticity:*

As one of its characteristic features, authenticity is constantly emphasized in ESP materials development. The word authentic denotes that the materials used in the ESP classroom (texts, tasks, activities … etc.) should reflect the real world. According to Valle "authentic, genuine, real or *unsimplified*[6] are adjectives randomly used today in ESP to refer to texts or materials that can be used within language learning contexts but which were specifically written or developed for an audience other than language learners" (ibid.). Thus, authentic materials expose learners to real language use as it is found in real communication situations mainly of native speakers.

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[6] Author's *italics*

Meanwhile, an authentic text as put forward by Jordan (1997, p. 113) is "normally used in the students' specialist subject area: written by specialists for specialists" (in ibid). Accordingly, the term 'authentic' refers to texts that are not principally produced for the sake of language teaching but rather for a real communicative purpose (Robinson, 1991; Harmer, 1991; Lee, 1995; Jordan, 1997; Basturkmen, 2010 in Lesiak-Bielawska, 2015, p. 09).

Though highly emphasized in ESP teaching, the concept of authenticity is still subject to controversial ideas and perceptions. Some researchers argue for the meaning of authenticity of materials to be understood in terms of their appropriateness, interaction, outcomes and efficiency rather than based on their origin (Widdowson, 1998; Kuo, 1993; in Valle, 2010, p. 145). Others focused on the distinction between text authenticity and learner authenticity, or authenticity of purpose against genuiness of text (Lee, 1995; Dudley-Evans & St. John, 1998, in ibid). As such, the focus is made on the authentic uses of materials in the classroom rather than on authentic materials themselves. This authenticity can be achieved in the ESP classroom through tasks inspired by real life communicative activities, e.g. engaging students in role plays after watching video; or through problem-based learning activities where students are asked to work collaboratively to solve typical field specific problems (Belcher, 2012, p. 09). Such tasks and activities would not only enhance students' communicative competence but even equip them with language learning and personal problem-solving strategies; hence increase of their metacognitive awareness (ibid.)

In the same vein, Valle considers Michan's (2005) approach to materials development as an eclectic view which links theory, research and practice to provide a five factored criteria for measuring authenticity (2010, p.146):

1- Provenance and authorship of the text.
2- Original communicative and socio-cultural purpose of the text.
3- Original content of the text.
4- Learning activity engendered by the text
5- Learners' perceptions of and attitudes towards the text and corresponding activity.

Similarly, Mishan shows how authentic materials can be used in the general language classroom and may be a source of inspiration to develop materials and tasks for ESP learners (ibid.)

In fact, these controversial views and attitudes towards the nature and role of authentic materials in ESP teaching/ learning widen the scope for their extensive use in ESP classroom

today in that they provide a link between the classroom and the outside world (Wong et al., 1995, in ibid: 148). However, total reliance on commercial material may spoil the essence of conducting needs analysis as an informative source for course design as well as these materials may not always cater to our students' specific needs. Thus, as Lesiak-Bielawska (2015) points out what is needed are needs-responsive instructional materials gathered at the stage of needs analysis, then adapted or developed by the ESP teacher (Belcher, 2012; Lesiak-Bielawska, 2015)

- **Specificity**:

Another key problematic pertaining to the issue of developing materials in the ESP course design is how specific the course should be regarding the target audience. For Valle, the problem of specificity relates mainly to writing objectives as maintained by Brown (1995) that "objectives should not include only performance (the students will be able to …) but also conditions and criteria" (2000, p. 88). In other words, a specific objective should precise not only what students will be able to do, but also "under what circumstances? Written quiz? Controlled speaking? Free use? And by what standards? All the times? 90 percent? 50 percent?" (ibid.). Such a detailed specificity, however, "can lead to suffocation of initiative and interest" (Yalden, 1987, in ibid) because objectives are based on students' needs which are subject to change especially when negotiated with students. Thus, as pointed out by Valle "specificity during the initial conceptualization of objectives may not be possible, or even appropriate" (ibid.)

Then again, the issue of specificity has been related also to the debate over the purpose of EAP classes. For this, Basturkmen (2010) makes a distinction between "wide-angled" and "narrow-angled" course (in Lesiak-Bielawska, 2015, p. 12). Wide-angled courses are developed for more general groups of learners and emphasize a set of generic skills in an area, e.g.: Business English skills; whereas narrow-angled courses cater for very specific learner groups, i.e. homogeneous learners in terms of needs and/or learners with a particular type of academic and/or work environment in mind, e.g. English for Accountants (ibid.). Accordingly, it is also possible to design more specific courses for sub-areas within the broad field of work or study, e.g. English for Financial Accountancy (ibid.)

Eventually, considering the issue of "wide and narrow angled" courses, Belcher posits that it is "a non issue" for many teachers since "instructional decisions should have more to do with the learners themselves than with instructor preference or beliefs" (2006, p. 139). Consequently, a wide angled approach to course design may fit undergraduate students or low proficiency

adults, while a narrow angled approach may be suitable for post-graduate students or high proficiency adults.

I.5.5. ESP Classroom Practice: Is there a Specific Teaching Methodology to Meet the Specific Needs?

A plethora of teaching methodologies has often characterized the foreign/second language classroom, yet no method has been claimed to be specific for any general English class. According to Richards & Rodgers (1982) "all language teaching methods operate explicitly from a theory of language and beliefs or theories about how language is learned". However, in the ESP classroom the specific teaching method becomes a controversial issue that underpins the interest of many researchers in the field of ESP course design.

In fact, a wide range of teaching approaches (e.g. direct approach, audiolingual approach, communicative approach…etc) employed in general English teaching have been adopted in teaching ESP. Many researchers believe that very little difference exists between teaching ESP and EGP (Robinson, 1991; Basturkmen, 2006; Lesiak-Bielawska, 2015; Kenny, 2016). For instance, Robinson (1991) argues that "methodology in English language teaching (ELT) and ESP differs little and that it is not possible to say whether general ELT has borrowed ideas for methodology from ESP or whether ESP has borrowed ideas from general ELT." (in Kenny, 20162, p. 57). In the same way, Kenny asserts that "there is no specific approach but adaptive one" (ibid.). Thus, the methods used in EGP are transferable to ESP. Furthermore, according to Robinson ESP methodology can be identified in terms of two characteristic features:

- ESP activities can be based on learners' specialism
- ESP activities can (but may not) have a truly authentic purpose connected with learners' target needs. (in Lesiak-Bielawska, 2015, p. 08)

However, for Kenny the characteristic features raised by Robinson can be applied in a homogeneous group only since "it would be difficult to implement activities on learners' specialism in a heterogeneous group as each learner would have a different target and different needs" (2016, p. 257).

From his part, Strevens, P. (1988, p. 44) highlights four teaching activities that are basic in both methodologies of ESP as well as general ELT since both conform to the same model of the language learning/teaching process. These basic teaching activities include:

- Shaping the input
- Encouraging the learners' intention to learn
- Managing the learning strategies
- Promoting practice and use

Accordingly, the ESP teacher can use methods and tools available in EGP and these, following Gajewskai Sowa (2014), draw on the approaches below:

- Activity-oriented approach which stresses the interdependence of language and context;
- Skill-oriented approach, the objective of which is the development of receptive and/or productive skills;
- Genre-oriented approach, where language learning focuses on texts representing different genres;
- Task-oriented approach, in which learners perform tasks inspired by real life communicative activities in professional settings (in Lesiak-Bielawska, 2015, p. 09)

In addition to these approaches, the researcher suggests a strategy-oriented approach where learners are explicitly made aware of the existence as well as use of different strategies and learning styles that may help them to perform a task or proceed effectively throughout the learning process to promote a given skill be it receptive or productive, for example critical reading strategies as it is the case of the present research.

With reference to the aforementioned approaches, ESP teachers can choose appropriate procedures to develop their own individual methodological frameworks that fit their local context. However, one should bear in mind that any methodological framework may be affected by specialized knowledge as well as learning processes that ESP students transfer from their specific context areas to the ESP classroom (Hyland, 2006, in ibid).

In her experience with teaching ESP to a group of Japanese engineers, Kenny argues for the use of content-based approach (CBA) following the theme-based model since many claims are made for the advantages of courses based on content-based syllabus as:

- They facilitate comprehension,
- Content makes linguistic form more meaningful,
- Content serves on the best basis for teaching the skill areas,
- They address learners' needs,
- They allow for integration of the four skills,

- They allow for use of authentic materials. (Brinton, Snow & Wesche, 1989; Mohan, 1986 in Kenny, 2016, p. 258)

Moreover, Kenny believes that in CBA there are various activities which are listed by Stoller (1997) as follows:

- Language skills improvement,
- Vocabulary building,
- Discourse organization,
- Study skills,
- Synthesis of content material grammar (ibid.)

Following this, Kenny confirms that her course was successful as "learners changed their attitude about the way to learn English and enjoyed it. Their vocabulary expanded by reading authentic materials and they managed to communicate with their colleagues in other countries with short conversations" (ibid, p. 259).

In sum, as Hutchinson & Waters (1987) assert there is no specific methodology for ESP which is the same thing in general ELT. Yet, this does not mean that any successful General English teacher can be a successful teacher of ESP as well. As put forward by Kenny "knowing General English methodology does not make a teacher successful in techniques that the teacher implements in the ESP classroom" (ibid); especially when the teacher is not familiar with the learners' specific subject matter. Consequently, ESP does not need a specific methodology to be taught, but an appropriate method that caters for promoting learners' needs-specific competences that should be based on awareness raising and lifelong learning.

I.5.6. ESP Course Assessment and Evaluation:

The identification of evaluation as the process of gathering, analyzing and interpreting information about someone or something to make a judgment about it has often been taken for granted. Moreover, some may view evaluation, pedagogically, as the assessment of students' achievements at the end of a course. In fact, though both concepts are ostensibly related, specialists have drawn clear distinctions between them.

According to Nunan (1986, p. 185), assessment refers to "the processes and procedures whereby we determine what learners are able to do in the target language", whereas evaluation refers to "a wider range of processes which may or may not include assessment data". As such, it

is noticeable that the concept of evaluation bears a broader sense than that of assessment since it considers all components of a program: course content, objectives, learners' learning achievements, and teachers' classroom methodology among others as put forward by Skilbeck (1984):

> "…assessment in the curriculum is process of determining and passing judgments on students' learning potential and performance; evaluation means assembling evidence on and making judgments about the curriculum including the processes of planning, designing, and implementing it"
> (Skilbeck 1984, p. 238, in Hedge, 2000, p. 351)

Furthermore, in teaching, concepts like 'testing' and 'measurement' should not be viewed as being synonymous to evaluation. In that, as Brown posits testing is confined "solely to procedures that are based on tests", and it is coupled with other types of "measurements, such as attendance records", it can be defined as 'measurement'; yet, "an even broader term" evaluation "includes all kinds of measurements as well as other types of information –some of which may be more qualitative than quantitative in nature" (in Johnson, 1989, p. 244), for instance classroom observation. Thus, it can be presumed that testing is merely a part of evaluation while the latter is a direct reflection of the learning environment.

Moreover, specialists identify two kinds of evaluation that can be employed for evaluating a course: formative (implicit) and summative (explicit) evaluation. The first kind (formative evaluation) takes place during the progress of the course and it informs teachers about students' grades, motivation, participation, the adequacy of teaching methodologies and activities. The second type (summative evaluation) occurs at the end of the course. It reviews the whole course in order to "determine whether the program was successful and effective" (Brown, in Johnson, 1989, p. 299) and to pinpoint elements for improvements (Hedge, 2000, p. 356). Disregarding its type, and as pointed out by Nunan "the data resulting from evaluation assist us in deciding whether a course needs to be modified or altered in any way so that objectives may be achieved more effectively" (1986, p. 185). Consequently, the effectiveness of any language program relates to soundly established program evaluation. For this Richards & Rodgers (1986) maintain that "the absence of a systematic approach to language program development in many language teaching institutions is largely attributable to inadequate allowance for program evaluation in the planning process" (p. 158).

From their part, Chang and Fox (2017) make distinction between assessment *of* learning and assessment *for*[7] learning. The former refers to traditional testing where teachers routinely engage in tests which measure achievement at the end of a unit or course; whereas the latter implies ongoing classroom assessment practices (p. 62). Assessment for learning, as conferred by Rus "involves both teachers and students and its main role is to identify the strengths and the weaknesses of the learning and teaching process, to provide feedback in order to improve" (2019, p. 369). In fact, this kind of assessment is highly reinforced in the reforms brought by the LMD system which is based on ongoing or continuous assessment instead of traditional testing alone.

Nonetheless, with reference to ESP Hutchinson & Waters (1987) propose two prominent forms of evaluation: learner assessment and course evaluation. Learner assessment in ESP comprises three types: placement tests, achievement tests, and proficiency tests. A placement test is mainly conducted at the beginning of the course to be informed about learners' linguistic competence and assess their mastery of the four language skills to determine their level according to which a suitable course can be designed (Harmer, 1998 in Chalikandy, 2013, p. 319). Moreover, an achievement test is done at any time throughout the implementation of the course. It principally aims at assessing what learners have learnt over a given period of time as claimed by Harmer (1998, p. 321) "these tests are designed to measure learners' language and skill progress in relation to syllabus they have been following" (in ibid). Finally, proficiency tests are carried out to assess learners' general language ability. For Brindley (2001), a proficiency test denotes "the assessment of general language abilities acquired by the leaner independent of a course of study" (p. 137). For instance IELTS and TOEFL are standardized commercial language proficiency tests that are used to check students' English language proficiency before their entry to a university in native English speaking countries. In addition to the previous types of tests, Brown distinguishes also diagnostic tests which imply the diagnosis of specific aspects of a language. For example, a reading diagnostic test would allow the teacher to find out those subcategories of what should be given special focus in the reading classroom. As claimed by Brown (2004, p. 47), a diagnostic test "should elicit information on what students need to work on in the future". With reference to the present study, a diagnostic test is opted for to elicit data concerning ESP students' critical reading ability.

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[7] Author's italics

Furthermore, there are two reasons that underpin the assessment of any ESP learning process: it can be a quantitative measure of competence as well as a motivational tool through involving students in their own process of language learning. As maintained by Cohen (1995), one of the foundational reasons of implementing classroom language assessment is to enhance "meaningful involvement of students with material that is central to the teaching objectives of a given course" (in Rus, 2019, p. 369). In the case of engineering students, the objectives of the learning course are derived from the material which is predominantly reflective of the students' area of interest which may guarantee a high level of intrinsic motivation among the students (ibid).

In the same vein, Rus considers Lee's conceptualization of "assessment as learning" to be an accurate perspective in the ESP classroom assessment as it denotes "the active role of the learners in taking charge of their learning during classroom assessment" (p. 09). In that assessment as learning:

> "[e]ncourages students to monitor and exert self-regulation over their thinking processes and stresses the importance of fostering students' capacity over time to be their own assessors. Students take a proactive role in their learning, use assessment information to self-assess and self-monitor their learning progress, reflect on their learning, and make adjustment in their thinking so as to achieve deeper understanding and to advance their learning" (p. 10)

As such, self-assessment is significant in ESP context wherein learners' performance measurement depends on predefined goals with identifiable objectives which often reflect certain academic or professional context. With reference to engineering students learning EFL, Rus construes assessment as learning as "a tool which measures a student's progress in English skills against a clearly defined set of requirements imposed by … what the context requires in terms of speaking productions, listening, reading and writing skills" (2019, p. 370).

On the other hand, based on her acquired experience teaching ESP to engineering students and focusing mainly on the communicative aspect as the focal point of major current trends in ESP teaching, Rus suggests alternative assessment, also referred to as authentic assessment, to demonstrate ESP students' language skills using authentic and communicative tasks which make assessment a great learning tool (ibid, p. 371). Some examples of alternative assessment techniques proposed by Rus are presented hereinafter (ibid, Pp. 372-73)

- *Portfolios*: these refer to students' collected documents whose structure and format are explained and practiced during the seminars. This continuous assessment method, as conferred by Rus, permits teachers to evaluate students' progress over a long period of time and helps students to self-assess their own work.

- *Mock job interviews*: this completes the portfolio method in that the language teacher, and based on the students' collected documents, conducts a mock job interview with both general and domain-specific questions. According to Rus, this method is beneficial as it helps boasting students' intrinsic motivation as it gives them the opportunity to try the complexities of job interviewing in class before experiencing them in real life.

- *Power-Point presentations*: This assessment method, as confirmed by Rus, is preferred by engineering students due to "the correctness and effective informational input which it implies as well as to its practical application to all kinds of projects" (p. 372). Power-Point presentations as an assessment technique is advantageous as its application involves multiple skills: teamwork abilities, research skills, writing skills, editing skills, and oral presentation skills. Moreover, it enhances students' motivation as it enables them to think creatively concerning their field of study.

- *Technical reports*: this requires engineering students to choose any topic of interest that relates to their curricula to be documented in a technical report which is presented either in written form or defended orally. This is also so beneficial as it helps students to acquire how "to organize research results, to formulate objectives and theses, to describe activities, to compare and discuss results, to structure texts on chapters and sub-chapters, to correctly use bibliography and employ citation styles" (373).

- *Videos*: working in teams, students are supposed to shoot a video on a given theme assigned by the teacher (for instance filming a scientific experiment at the university laboratory). In fact, using videos as an assessment technique is highly appreciated because it is very motivational since it uses technology which implies the integration of a variety of skills and abilities.

- *Interdisciplinary projects*: this is based on a combination of subject matters. As exemplified by Rus, students can be asked "to write a business plan, document it with genuine information from the economic and industrial environment of the city and present the findings into English" (ibid). Interdisciplinarity, as maintained by Rus, is beneficial for engineering students' personal and professional life as it prepares students to perform as future engineers.

As a matter of fact, Rus's alternative types of assessment suggested for ESP, mainly engineering, classes are interactive and attractive for both teachers and students. They help language teachers to keep students focused throughout the teaching process. They also reinforce students' engagement in becoming autonomous in acquiring both English language as well as specialized knowledge.

On the other hand, course evaluation is aimed at estimating the ESP course usefulness in terms of responding effectively to the learners' needs. This evaluation covers the syllabus, the materials, teaching methods and activities, and it can be realized through different means, for example: evaluating test results, questionnaires, interviews, formal or informal discussions …etc. Furthermore, course evaluation can be done by an insider or an outsider evaluator. Yet, both types of evaluation have advantages and disadvantages (Hutchinson & Waters, 1987) that is why it is advisable to conduct both types of evaluation simultaneously for more reliable results. Following Alderson & Waters (1987: 69), there are four prominent aspects that should be considered in ESP course evaluation:

a- What should be evaluated?
b- How can ESP course be evaluated?
c- Who should be evolved in the evaluation?
d- When (and how often) should evaluation take place?

All in all, as a thoughtful component of ESP course design, course assessment and evaluation is substantial for multiple reasons. It can help teachers enhance their self development by informing them about how others perceive their teaching methods. In addition, course evaluation can provide useful feedback for institutions to improve their quality of instruction. Moreover, as believed by many researchers, ESP course evaluation is an ultimate measure for making decisions on curriculum changes, documenting events, measuring cost-effectiveness, identifying intended and unintended outcomes, and clarifying objectives (Rahman, 2006; Momeni & Rasekh, 2012, in Celik & Topkaya, 2016, p. 327). Thus, it is obvious that the future of the ESP course is determined by the feedback it receives.

I.6. The Algerian ESP Project: Current Critical Issues and Raising Opportunities

In addition to general ELT instruction in pre-university education, Algeria has often shown considerable interest in integrating ESP into most, if not all, of tertiary level studies as a response

to the worldwide growing demand for English language. At the tertiary level, though considered as an additional module English is compulsory in different departments nationwide. Thus, university students are required to attend ESP courses depending on their field of specialism. This practice has mainly been reinforced thanks to the recent LMD reformation program which widened the scope of ESP teaching to include all domains of study and throughout all stages: Bachelor, Master and Doctorate.

In 1993, the national coordinator of the Algerian Universities ESP Project, Osmane Bencherif, declared in the ESP Maghreb Conference that the Algerian ESP project dates back to 1987 when a number of British Universities, namely the university of Manchester, Glasgow, Leeds, Sheffield, Nottingham, and Salford accepted to sign individual agreements with the Algerian Ministry of Higher Education and Scientific Research (Bouabdallah & Boyacoub, 2017, p. 2018). Thanks to these agreements, these British universities devoted time and efforts to develop Algerian-British cooperation mainly at magister and doctoral levels in the field of science and technology through allowing some Algerian students to be enrolled at these universities. The latter were to be twined each with an Algerian tertiary institution as follows:

- University of Blida with Salford University which had to deal with mechanical engineering.
- University of Constantine with Glasgow University for computing purposes.
- University of Oran more precisely USTO (Université des Sciences et Technologie d'Oran) with Nottingham University to fulfill electronic needs.
- INELEC (Institut National d'Electricité et d'Electronique) and the University of Sheffield which had to tackle electricity and electronics techniques (Ibid, p. 219)

Meanwhile, three ESP centers were established in the following regions: Oran, Algiers, and Constantine. In February 1988, these centers started their work officially and they were supplied by the British council with the necessary pedagogical equipment to function adequately (Ibid.) as cited by Bouabdallah and Bouyacoub, the following are the most important objectives underpinning the Algerian ESP project:

- Educational and scientific objectives consist of knowledge base acquisition, access to technology and science, participation and effective communication and continuing professional development.
- Economic and business objectives aim at creating opportunities for development, better preparing managers and employers for globalization, ensuring profitable partnership and participation, and widening economic and investment horizons.

- Cultural objectives aim at developing individual potential, fostering cultural understanding, enhancing literacy skills and curiosity, and preparing learners as world citizens. (Ibid)

In fact, though the Algerian ESP project seems theoretically rewarding, practically the current situation of ESP teaching in Algeria tells lamentable realities. Despite the growing popularity of ESP in Algerian universities, especially after the introduction of the LMD system programs, "most Algerian institutions and universities fundamentally do not propose a balanced and well equipped ESP programs to their learners" (Izidi & Zitouni, 2017, p. 17). Moreover, ESP teacher training has never been taken seriously by policy makers in that ESP teaching is rarely found fulfilled by an ESP practitioner.

Consequently, the Algerian ESP practitioners are primarily general ELT teachers who have never been trained in considering learners' personal interests and needs. Rather, grammatical aspects of the language are the predominant characteristic features of their programs. Add to that the allotted time to the English course is only one hour and a half per week. This time is most often by the end of the day which makes students reluctant to attend the English class, hence missing the course and suffering low levels in that language.

Eventually, while ESP is internationally considered as being in its infancy, in Algeria is not yet born as the concept of ESP is still not being able to transcend the walls of the departments of English where EFL is taught as specialty. This reality makes the situation in Algeria more perplexed, especially when it comes to drawing distinctions between ESP and EGP in contexts where English is ought to be taught for specific field-based needs like: Medicine, Computer Science, Business, and Engineering …etc. Therefore, despite the current advances realized in the field of ESP worldwide, Algeria is still facing serious primitive problems linked to the quality of ESP teaching both theoretically and practically. At a time when most non native English countries are striving to provide their people with different facilities and opportunities to use English effectively to cope with nowadays worldwide changes, the Algerian student is still thinking of attending the English class for the mark only. This lack of motivation among Algerian students is often reinforced by part-time teachers of English who are not well-trained in teaching in general and in ESP in particular. Furthermore, the situation of ESP teaching in Algeria is undermined by the following crucial issues: lack of sufficient administrative interest, lack of professionally qualified ESP teachers, students' awareness of and motivation towards the ESP course, and the effectiveness of the ESP instruction. Yet, these challenging issues, and if

critically pondered on, may create room for better opportunities for some change and improvement.

I.6.1. Lack of Sufficient Administrative Interest:

As it has been already shown, the Algerian government has often been aware of the paramount importance of teaching the English language from an early stage. Therefore, EFL is taught in Algerian middle schools for four years, then in the secondary schools for three years. Next, at the university the English language can be studied as a specialty in the departments of English or as an additional but compulsory module in all other fields of studies mainly that of science and technology. Here, English teaching is supposed to respond to the learners' specific needs through adequate ESP courses depending on the learners' specialism.

Furthermore, nowadays world circumstances have imposed ESP as an essential skill that ought to be mastered by even academic and administrative staff. By and large, the latter should be the first responsible in enhancing interest in ESP teaching/learning in Algerian higher education. In fact, though sometimes on papers things seem well planned, in real contexts nothing is effectively carried out. As shown in the literature, several complaints are expressed by Algerian researchers that the Algerian ESP teacher is usually conceived to be the only agent who is unable to take ESP teaching responsibilities efficaciously (Mebitil, 2011; Baghli, 2014), neglecting in such a way the role of administrators and policy makers.

Regardless of their significant part, ESP teachers must not be burdened with the whole obligation of ESP teaching. What can an ESP teacher do for an ESP course that is planned to be taught for one hour and a half per week? How can an ESP teacher design an effective ESP syllabus with the shortage of up-to-date resources and materials? How can this teacher be able to be a competent ESP practitioner in the total absence of pre-service and in-service teacher training programs? How can this teacher fulfill his/her duties as a university teacher with the lack of social, economic, academic and pedagogic facilities which are prerequisites for progressing in any educational field?

Algerian ESP teachers have become victims of insufficient administrative interest. In a recent study, Bouroumi (2018) confirms that:

> "The context (or the institutions) within which the ESP
> classroom operates, tremendously effects the ESP teacher's
> efforts which are rendered ineffective, at times useless,

because of (1) the existence of the ESP course in isolation from any other ESP curriculum components and from the specialism's curricula, (2) the almost nonexistent ESP community and its support, (3) the lack of resources and ex-curricular learning and practice opportunities" (p. 01)

Pondering over this problem, Bouroumi raised the question "What are the MESRS[8] educational policies concerning the ESP issue" (ibid). Perhaps, it is better to reformulate this inquiry as such 'Have the MESRS enacted any educational policies as far as the ESP issue is concerned?' The question is supposed to be answered by policy makers and administrative staff. Otherwise, how can the Ministry of Higher Education and Scientific Research justify the absence of an ESP program in its tertiary institutions as claimed by Izidi & Zitouni "programs of science courses are devised by the Ministry of Higher Education and Scientific Research. For ESP courses, no program is available or has been advanced or proposed by the Ministry" (2017, p. 20).

As a microcosm, the National High School for Hydraulics (the context of the present study), one of the biggest institutions of higher education in Algeria, apparently shows great interest in instructing its students in ESP. The latter, here, is often referred to as Technical English. A compulsory module that is aimed at making students familiar with technical vocabulary in the domain of hydraulics to be able to have access to specialized knowledge provided in English and which is generally not obtainable in mother tongue or French since nowadays more than 85% of academic papers are published in English. In fact, regardless of some grammar books, in the aforementioned institution the teachers of English are supplied with no materials to be able to pursue their so called ESP courses.

Once upon a time, the Algerian academic administration came to realize the advantages of ESP courses, so the Algerian ESP project was inaugurated. Since then, no clear plan has been put into effect. This stagnation of the ESP development is mainly due to the shortsightedness of policy makers in drawing a lucid vision of ESP orientation in Algeria. Therefore, it is high time to reconsider this issue through reflecting upon available opportunities.

Accordingly, the ESP course at the university should be allocated more than one hour and a half. Investment in teaching materials is highly required through active coordination with national as well as international universities and institutions to develop ESP textbooks. Furthermore, as put forward by Bouabdallah & Bouyacoub "the Ministry of Higher Education

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[8] French abbreviation for 'Ministère de l'Enseignement Supérieure et de la Recherche Scientifique', i.e. Ministry of Higher Education and Scientific Research.

and Scientific Research needs to encourage the necessary efforts of improving such a primordial side of the EFL policy so as to arouse enthusiasm and interest among learners and teachers alike" (2017: 226). Eventually, it is also the responsibility of policy makers to seriously treat the issue of unqualified ESP teachers that is tackled hereinafter.

I.6.2. Lack of Professionally Qualified ESP Teachers:

As compared to General English, English for Specific Purposes tends to investigate the needs of the learners, preparing teaching materials and devising appropriate teaching methodologies. Meanwhile, studies in the field of ESP have discussed various issues that underpin teachers' professional qualifications. Relevant to this, considerable interest has often been given to ESP teacher's role, teacher training and teacher's competences, among others.

Considering the issue of ESP teachers' role may undoubtedly lead us to Dudley Evans & St. John (1998) who prefer the term practitioner as it seems more complete to describe an ESP teacher's role that is much more than teaching. For them the concept of the ESP practitioner assumes the role of a teacher, course designer and materials provider, collaborator, evaluator and researcher.

In fact, as a *teacher,* the relationship teacher-student is much of a partnership since students may know more about the subject content than their teacher. So, he/she has to generate authentic communication in his/her classroom and select appropriate teaching methods that suit the learners' target needs. As a *course designer and material provider*, he/she has to select appropriate materials for the course and adapt them in designing tasks. As a *researcher*, he/she needs to be aware of the up-to-date researches in the field and take them into consideration in the selection of methods, designing tasks and materials. As a *collaborator*, he/she has to collaborate with subject specialists or experts in the field of the specialty in order to be more familiar with. As *evaluator*, he/she has to evaluate students' tasks, their courses and teaching materials through classroom discussions and ongoing needs analysis.

In the same context, the issue of ESP teachers' professional qualifications has also been widely tackled. According to Thomas (1993), like general language teachers, ESP teachers have to acquire the following three competences: Language Competence, Pedagogic Competence and Language Awareness. In addition to that, the Algerian researcher Mebitil, N. (2015) has emphasized a forth competence which is that of "Specialized Knowledge". The latter implies ESP teacher's knowledge of subject area besides their language knowledge.

Figure.1.13. Teachers' qualifications (Mebitil, 2015, p. 45, adapted from Thomas, 1993)

However, Hutchinson & Waters (1987) believe that the ESP teacher does not need to learn specialist subject knowledge. According to the same authors, he/she requires three qualities only which are:

1. Positive attitude towards ESP content
2. A knowledge of fundamental principles of the subject area
3. An awareness of how much they probably already know about the subject matter

In the same way, Robinson (1991, p. 96) claims that the most important quality is "flexibility" which means the ability of changing from being a general English teacher to being specific purpose teacher. For this, Robinson asserts that "whatever the training that is given to an ESP teacher and whatever the situation, […] becoming an effective teacher of ESP requires more experience, additional training, extra efforts, a fresh commitment, compared with being a teacher of general English."

Moreover, the problem of subject area knowledge has entailed other issues like the question of who teaches ESP, an EFL teacher or subject specialist teacher. In fact, it has been argued that ESP teachers are not "specialists in the field, but in teaching English, their subject is English for the profession but not the profession in English" (Bojovic, M. 2007, p. 493). Indeed, an experienced ESP practitioner "only carries the required tools, frameworks, and principles of course design and apply them to new content subject" (Ibid). Practically, and in a survey on the efficiency of ESP teachers in Iranian Universities, Delvand confirms that "language instructors

and professional ESP teachers are more qualified [than content teachers] to teach ESP" (2015, p. 59)

The last issue tackled here is that of theoretical and practical training of ESP teachers. According to Bracaj, M. (2014), ESP teacher training comprises the following elements/steps:

4. Selection: not all EFL teachers can be ESP teachers, only those who are ready to be.
5. Continuing personal education: this can be done personally or through in-service courses.
6. General professional training as an educator and teacher.
7. Special training as a teacher of a foreign language teacher.

As far as the Algerian context is concerned, Mebitil (2015) suggests pre-service training and in-service retraining of ESP teachers to be better able to meet learners' actual needs and future prospects. However, Chen calls for self-training through classroom-based action research as "it will not suffice for language teachers to sit around hoping for ESP training programs and supervisors to appear, because such training … suffers inevitable limitations… and can rarely prepare language teachers to interact as ESP practitioners" (2000, p. 390). Thus, one inevitable way towards ESP teachers' qualification improvement is professional self-development.

Perhaps a lot has been said about language teachers' development in general without specific consideration of teachers of English for Specific Purposes. For example, Richards & Farrell (2005, p. 4) view teacher development as a long-term goal to facilitate growth of teacher's understanding of teaching and of themselves as teachers through examining different dimensions of a teacher's practice as a basis for reflective review. Indeed, Richards & Farrell provide some examples of goals from a development perspective; these examples include:

- Understanding how the process of second language development occurs.
- Understanding how our roles change according to the kind of learners we are teaching.
- Understanding the kinds of decision making that occur during lessons.
- Reviewing our own theories and principles of language teaching.
- Developing an understanding of different styles of teaching.
- Determining learners' perceptions of classroom activities.

Therefore, strategies of teacher development as Richards & Farrell posit often involve documenting different kinds of teaching practices, conversation with peers on core issues and collaboration with peers on classroom projects (Ibid.).

Yet, as far as ESP teaching at the National High School for Hydraulics is concerned, English language teachers, as many other ESP teachers, have been trained in to teach EFL and not ESP and that constitutes quite a big challenge for them to face. Relevant to this, professional self-development for Algerian ESP teachers as a whole and more precisely at the ENSH are urged, more often than not, to reflect on professional self development. This can be explained in terms of teachers' personal initiatives to develop their professional abilities to become qualified ESP practitioners. It is believed that this can be realized through different ways, among which four main aspects are focused hereafter:

- *Classroom-based action research*: Many scholars support this aspect which is mainly aimed to foster teachers' ability to reflect, improve their teaching and grow in personal professionalism (Nunan,1997; Richards & Lockhart, 1994; Palmer & Posteguillo, 1997; Dudley-Evans, 1997; Chen, 2000)

- *Participation in conferences, workshops and meetings*: It is always argued that this kind of activities permit for teachers in general and ESP practitioners in particular to exchange teaching experiences between not only experienced but even novice language teachers.

- *Collaboration between language teachers and subject specialists (teachers and learners)*: This is highly recommended to promote ESP teachers understanding of the specific content they are involved in and coping with specific issues that might emerge in the ESP classroom. Yet, from a psychological point of view, this collaboration helps ESP teachers' integration in a non-language environment; hence overcoming the problem of isolation.

- *Commitment to ongoing self-improvement*: This is in fact, the most prominent aspect in professional self-development of ESP practitioners as it is believed to be the only way to create a certain kind of self-confidence that can ensure not only ESP teachers' qualification improvement but even guarantee lifelong qualified professional development.

Taking the aforementioned aspects of professional self-development into consideration, ESP teachers in Algeria generally and at the ENSH particularly, can be able to effectively bridge the gap between the general English they are trained in and the English for specific purposes they have to teach.

Ultimately, ESP is not a new specialty which requires a specialized knowledge to acquire. However, the role of the ESP practitioner is much more complex than that of a General English teacher. Therefore, in order to bridge the gap between EFL and ESP, Algerian ESP teachers in general and ENSH teachers in particular have to be well trained professionally in order to cope

with the specific needs of their students and the special roles they have to meet. This can be achieved through professional self-development that is based on action research, the collaborative relationship of teachers-teachers and teachers-learners, and teachers' commitment to ongoing self-improvement.

I.6.3. Students' Awareness of and Motivation towards the ESP Course:

Motivation is often perceived as being very hard to be defined. For this Gardner claims that "motivation is a very complex phenomenon with many facets…. Thus, it is not possible to give a simple definition" (2006, p. 242). Accordingly, the concept of motivation has usually been approached differently by various schools of thought. While the behaviorists consider motivation as the anticipation of reward (Brown, 2000, P. 160), the cognitivists relate the same term with learners' decisions mainly in terms of "the choice people make as to what experiences or goals they will approach or avoid, and the degree of effort they exert in that respect" (Keller, 1983 in ibid). From their part, the constructivists place "further emphasis on social contexts as well as the individuals' decisions." (ibid). Nevertheless, though apparently the aforementioned schools of thought seem different, they similarly emphasize the concept of 'needs' in their definitions of motivation. Thus, with reference to these schools, motivation as stated by Brown, can be viewed as "the fulfillment of needs" which is "rewarding, requires choices, and in many cases must be interpreted in a social context" (2000, p. 161). Motivation can be simply put as a kind of interior energy that fuels a powerful desire which usually and continuously pushes us towards achieving something like learning a foreign language.

In fact, it is undeniable that motivation plays a significant role as one of the crucial factors that enhance foreign language learning as well as influence learners' academic achievement. For this, it is argued, now and again, that learners with high level of motivation succeed much better in learning the target language than learners with lower level of motivation (Brown, 2000; Lifrieri, 2005; Gardner, 2006). This is mainly due to the fact that when "one is motivated, he/she has reasons (motives) for engaging in the relevant activities, expends effort, persists in the activities, attends to the tasks, shows desire to achieve the goal, enjoys the activities, ect.) (Gardner, 2006, p. 243)

Furthermore, studies on motivation in second/foreign language learning often categorize motivation into two distinct types, namely: instrumental versus integrative motivation (Gardner, 1983). However, researchers like Harmer (2001) opt for including instrumental and integrative motivations under the title of extrinsic motivation and prefer to classify the latter into extrinsic

and intrinsic. The former can be interpreted in terms of a desire to get a reward and /or avoid punishment as a response to an external motive which might be tangible like money or psychological such as praise (Brown, 2000). In EFL context, this type of motivation can be destructive for the students in that:

> "When a student is learning because he is promised rewards or because he wants the rewards, he will be highly motivated to come to classes and learn and achieve the goal that is set for him. But when these rewards are taken away or sometimes even if students do not see any "punishment", they will not be interested in coming to class and learning the language any longer." (Navickinene, et al., 2015, p. 100)

This is, in fact, highly reflected in formal education through the reward/punishment system of learners' evaluation.

On the other hand, intrinsic motivation refers to that strong feeling which is fostered from within an individual rather than because of an external reward. This type of motivation comes from the pleasure of accomplishing a task for its own sake. Students with this kind of motivation do not need external rewards to work hard and succeed academically. Nonetheless, since it is innate or comes from inside, teachers can do little for enhancing students' intrinsic motivation other than providing a supportive classroom learning atmosphere. Yet, in higher education generally and in ESP context particularly, intrinsic motivation is extremely boosted by extrinsic motivation especially among the students who are aware of the value of the ESP subject for their future life as well as their academic and professional career.

Moreover, a fact worthy of attention is that motivation is closely linked to learners' attitudes. The latter, as elaborated by Gardner (1980, p. 267) is "the sum total of man's … feelings, prejudice or bias, preconceived notions, fears, threats, and convictions about any specified topic". Likewise, Ajzan defines attitudes as "a disposition to respond favorably to an object, person, institution, or event" (1988: 04). In the same vein, Baker identifies the concept of attitudes in terms of "a hypothetical construct used to explain the direction and persistence of human behaviour" (1992, p. 10).

In language learning, Gardner conceives attitudes as constituents of motivation, in that, as he puts forward "motivation … refers to the combination of effort plus desire to achieve the goal

of learning the language plus favourable attitudes toward learning the language" (1985, p. 10). Nevertheless, Wenden (1991) goes further in approaching the concept of attitudes through presuming that this term is composed of three elements, to wit: cognitive, affective, and behavioural. The cognitive element refers to the set of ideas, beliefs or opinions about the object of the attitude. Then, the effective element reflects the feeling and emotions ('likes' or 'dislikes', 'with' or 'against') one has for an object. Lastly, the behavioural one is defined in terms of one's corresponding actions or behavioural intentions toward the object (Al-Tamimi & Shuib, 2009, p. 33).

Moreover, it is generally assumed that language learning is highly affected by attitudes towards that language. Relevant to this, Karahan (2007) asserts that "positive language attitudes let learner have positive orientation towards learning English" (ibid.). Therefore, it is quite clear that, besides motivation, attitudes play a vital role in foreign language learning as they may determine students' success or failure in learning the language.

Regarding their importance, a plethora of research has been conducted worldwide speculating learners' motivation and attitudes in different fields of EFL and ESP is no exception. Most, if not all, of the realized studies have shown that students in different countries predominantly reveal positive attitudes towards the target language (Vijchuala and Lee, 1985; Sarjit, 1993; Benson; 1991; Buschenhofen, 1998; Arani, 2004; Karahan, 2007, Qashoa, 2006; Al-Tamimi and Shuib, 2015). The same studies emphasize the firm link between positive attitudes towards the target language and the ability of the students to proceed successfully in higher education.

As a matter of fact, the majority of Algerian students acknowledge English as a vital tool to facilitate access to different forms of information that relate to their fields of specialization. Yet, despite this acknowledgement, recent research reveals a lack of motivation among Algerian ESP students. For instance, in a study conducted by Hamzaoui and Graia (2014), the results showed that biomedical engineering students at the University of Telemcen are not motivated towards their ESP course. From her part, and while elaborating on the Algerian ESP issue, Bouroumi (2018) describes the Algerian ESP students' level of motivation as being non-satisfactory.

Following the above mentioned researchers, there exist many reasons behind Algerian ESP students' low motivation. In fact, these reasons are principally pedagogical such as:

- Low English language proficiency
- Inappropriate course content
- Teaching methods and materials
- Unpleasant classroom atmosphere
- Inadequate teacher-student relationship
- Insufficient timing allocated to the English course (Hamzaoui and Graia, 2014, p. 01)

In addition to the previous reasons, Bouroumi adds:

- Negative beliefs and attitudes towards the English course
- Heterogeneous groups of learners, rendering ESP courses too demanding for some and not challenging for other students
- A break between their specialism's courses and the ESP one (Bouroumi, 2018, p. 02)

In fact, there is one factor that fosters all the preceding reasons which is the students' lack of awareness of the essence of the ESP course as a distinct branch of the EFL field. This is, perhaps what renders the Algerian ESP context a bit particular in that instead of making needs analysis as the first step in ESP course design, the initial step should be the introduction of the concept of ESP to the students through raising their awareness about ESP as an advanced field of general ELT and which has its specific objectives and requirements. As claimed by Guerid (2015), in the Algerian university students are given English courses only because decision makers are convinced about the importance of English for these students in their study as well as in their work later on. Certainly, this is not enough. Thus, surely an instruction that does not cater for increasing its learners' conscious awareness of its fundamental components can never be deemed as an effective instruction.

I.6.4. The Effectiveness of ESP Instruction:

It is widely believed that proper and effective teaching practices enhance learning in foreign language classrooms. In ESP contexts, as it has been previously discussed, many factors have to be considered while planning an ESP course, including learners' needs analysis (Strevens, 1988; Dudley-Evans, 1998), course goals and objectives (Hutchinson & Waters, 1987; Gatehouse, 2001), teaching materials and methodology (Waters, 1993; Graves, 2000),among others. All these factors, in fact, have serious impact on the success of ESP instruction. Moreover, as argued by Pariseau & Kezim (2007) teaching effectiveness in ESP "increases when the teacher becomes a facilitator and coach rather than a lecturer" (in Liton, 2012: 05).

As a matter of fact, some researchers like Hutchinson & Waters (1987, p. 18) believe in that "there is … no such thing as an ESP methodology" as ESP is much perceived as materials-driven rather than methods-driven enterprise (Master, 1997; in Belcher, 2006, p. 137). This approach to ESP pedagogy is frequently supported by the notion that ESP cannot be completely separated from general ELT. Accordingly, teaching methods which are predominant in EGP context may also be feasible in ESP context.

Then again, looking at ESP as the teaching of English grounded on learners' specific language purposes, other researchers emphasize that ESP instruction should be handled cautiously. As pointed by Belcher ESP "must be carefully delineated and addressed with tailored-to-fit instruction" (2006, p. 135). In a similar vein, many specialists advocate communication to be part of ESP pedagogy where developing communicative English should be given priority for language use as a key factor to achieve successful language learning. This communication based pedagogy is frequently practiced through Content-Based Instruction or CBI which is considered as the prevailing approach in ESP teaching. Here, content should not consist of information about language but rather function as a carrier of language to make language use meaningful; hence increasing language acquisition and task performance (Dudley-Evans & St. John, 1998; Carson, Taylor & Fredella, 1997; in ibid.)

Another strategy also found useful and practicable for ESP classes is that of collaborative teaching. The latter, ostensibly, requires two teachers, a language teacher and subject specialist teacher, practicing their job together in the same classroom and at the same time; this may solve the problem of language teachers lacking sufficient content knowledge and content teachers lacking linguistic background to efficiently express their knowledge in the target language. Furthermore, collaborative teaching can also be practiced through teacher-student co-action. Relevant to this, Belcher argues that:

> "Collaborating with students on investigations of disciplinary or workplace discourse and even an assessment of learner performance, acknowledging the students' content area expertise while serving as the language specialist, not only scaffolds the specialist knowledge learning curve for the instructor, but also gives the student a valuable confidence-boosting role to play." (2009, p. 13)

In addition, a noteworthy fact is that recent pedagogy urges learner autonomy as the focal point of any instruction including ESP. In this respect, the same author asserts that "learner

autonomy may be the ultimate goal of any ESP course or of any type of instruction at all" (ibid, p. 10). Such a goal can be achieved through accomplishing different types of strategy training (e.g.: increasing students' awareness of how written or spoken texts accomplish what they aim for) that should undergo modeling, practice, scaffolding, and culminate in critical reflection on what has been learned (ibid).

Considering the aforementioned approaches to ESP teaching whose efficiency is acknowledged worldwide, one might posit the question about the belonging of the Algerian ESP instruction and its effectiveness in coping with current international higher education pedagogies as well as in responding to its learners' wants, lacks and needs. In fact, an expeditiously depicted image of the Algerian ESP situation is put forward by Bouroumi as follows:

> "[T]hrough all Algerian higher education institutions, the description of a typical ESP course does not vary much: an English language teacher –a part time one in most cases- meets a group of students – a large and heterogeneous in most cases – for a weekly ninety minutes session to deal with some technical topics, vocabulary and grammar. After this very brief learning opportunity –from which very few students would have benefited – the students get again absorbed in their specialty courses, which they consider as separate from and more serious than the ESP course!" (2018, p. 02)

Consequently, and undoubtedly, we are all urged, most frequently, to ponder over the situation of ESP instruction in Algerian higher education institutions. It is urgently required that everyone –administrative staff, teachers and students- must be aware of the onus of responsibility in handling a serious Algerian ESP project; a project that has to be tailored-to-fit the current prerequisites of critical paradigms of ESP teaching. A project, whose supreme goal should be the development of higher order thinking skills to form well rounded individuals who are able to communicate interactively, think creatively and read critically, individuals who are capable to analyze and synthesize, to judge and evaluate constructively in response to present world non stopping changes. Thus, it is extremely believed that promoting Algerian ESP students critical reading strategies has become an urgent need. This can be achieved, as the present study suggests, through infusing critical reading activities in ESP instruction as it is detailed in chapter two.

Conclusion:

This chapter which constitutes the first part of the theoretical dimension of the present research attempted to review the available literature revolving around the study field of ESP as an expanded branch of general ELT through highlighting the theoretical perspectives and practical issues as far as ESP teaching is concerned. As such, the beginning of the chapter is devoted to depicting analytically the shift from traditional paradigm of EFL teaching/learning to current critically-based approaches to teaching ELT generally and ESP particularly. As the latter is the focus of the present study, following sections of the same chapter are dedicated to the diagnosis of the various aspects of course design through foregrounding the conceptualization of goals and objectives, materials development, ESP classroom teaching methodology, and last but not least course assessment and evaluation.

The chapter also tried to highlight the context of the present research, ESP teaching in Algeria which is also given momentum through pondering on the Algerian ESP project since its inauguration and shedding light on some of its current challenges and raising opportunities. Accordingly, the chapter devoted valuable space to serious ESP issues in Algeria like: lack of sufficient administrative interest, lack of professionally qualified teachers, students' awareness of and motivation towards the ESP course, among others.

In the same vein, the next chapter endeavors to complete the theoretical part of this study through indulging into related literature to developing critical reading strategies among ESP learners mainly in terms of pertinent issues and pedagogical implications.

Chapter Two

Promoting Critical Reading Strategies among ESP Learners: Pertinent Theoretical Issues and Pedagogical Implications

Introduction:

One of the four language skills, reading is certainly the most essential skill to master, especially for students who are learning EFL for specific purposes. The findings of the different researchers that have been conducted on the nature of the reading activity have imparted contrasting perspectives about what better fits the reading pedagogy. Not only this, but they even transcend the literal understanding of texts through raising crucial enquiries about reading as a critical activity that requires higher order thinking abilities to mark an outstanding paradigm shift from reading comprehension to critical reading or critical literacy.

As such, and with reference to the second theoretical aspect of the present study which revolves around the development of critical reading strategies among ESP learners predominantly in terms of pertinent issues and pedagogical implications, the main objective of this chapter consists in reviewing available literature on the skill of reading in general, and critical reading and its related aspects in particular. Accordingly, critical reading and critical reading strategies are thoroughly discussed with specific focus on realized studies about the infusion of critical reading strategies in ESP instruction worldwide and nationwide as well. The focal point here stands for that integrating critical reading strategies in Algerian higher education may empower the Algerian university student.

II.1. Towards Understanding the Nature of the Reading Activity: Exploring Reading as a Multifaceted Process

How many times have you been moving your eyes left and right, up and down while looking at your hard or online documents trying to decipher those encoded symbols or letters to get the desirable meaning or something else? Have you ever asked yourself about the nature of the activity you are doing? The answer perhaps, can be as simple as 'I am reading' or as complex as the difficult task of exploring and diagnosing the reading activity for the sake of reaching a persuasive interpretation that can help our understanding of the reading act as a multifaceted process.

In fact, it is generally believed that enquiries like "What exactly is reading? What do we do when we read?" are difficult to answer as claimed by David "because even scholars in the field do not fully understand the details of the process" (1986, p. 129). However, in an attempt to approach the concept of reading, the same author posits that "we read by steadily moving our eyes across the page, identifying clusters of letters as words, then adding word to word to form

phrases, clauses, and sentences which we can, finally, decode for meaning" (ibid.). On the other hand, David adds that reading is "primarily a cognitive process, and the key to fluent reading is not a kind of visual gymnastics, but knowledge" (ibid.). In a similar vein, Koda puts forward that reading is "converting print into language and then to the message intended by the author" (2007, p. 01). Another definition by Urquhart & Weir implies that "reading is the process of receiving and interpreting information encoded in language form via the medium of print" (1998, p. 22). Additionally, Hellekjaer asserts that "reading comprises decoding the written text on the one hand and efficiently processing the information on the other hand" (2007, p. 02).

Pondering on the above definitions and others not stated here, it can be assumed that attempts at approaching the concept of reading tend to fall into two important streams. The first one views reading from a linguistic or technical angle which involves the act of decoding written symbols (through pronunciation) into the spoken language which may or may not entail understanding. The other stream of definitions revolves around comprehension for that reading is seen as an active process of comprehending. In fact, the first case is typical of beginner readers especially at the first stages of their experience with learning the target language. It is reading in its very narrow sense. Going a step further, mainly when decoding is coupled to understanding, the activity of reading becomes reading comprehension. The latter, as a matter of fact, is what concerns scholars most.

Ostensibly, there have been several endeavours to provide a clear conceptualization of the reading comprehension process. Yet, though numerous most, if not all, of these endeavours agree on the fact that there are salient factors that underpin the act of reading comprehension namely: (1) the reader, (2) the text, and (3) the context. According to Pearson & Cervetti, one or another of these three elements has prevailed during distinct periods in the historical development of reading comprehension research (2015).

Until the mid-1960's, the text was the focal point of comprehension. That period was primarily dominated by the behaviourist theoretical perspective (Thorndike, 1910 ; Watson, 1913 ; Skinner, 1957) which stands for that only observable stimuli and responses are worth consideration as psychologically applicable informative phenomena (Stern, 1983). As such, from a behaviourist point of view the text is predominant in the comprehension process. The latter, as described by Pearson & Cervetti (2015) starts with the reader's visual analysis of the pertinent features of each letter until those letters are recognized; then, the letters are mapped onto sounds through pronunciation. Lastly, the reader listens to the output and achieves comprehension. This

model of reading is well known as the *bottom-up* model. Here, as put forward by Henkel (2006) "the reader needs to gather visual information from the written text (e.g., letters and words), identify the meanings of words, and then move forward to the processing of the structure and the meaning of larger syntactic units, such as phrases or sentences" (p. 120). As mentioned by Pearson & Cervetti (2015: 03), this very model is also named as *outside-in* which means that the comprehension process begins outside of the reader (i.e. in the text),

Obviously, the bottom-up processing of reading is based on the notion that the human mind discerns the constituent parts of a text and rearranges them together to create meaning. Thus, after distinction of letters and their matching sounds, lexical items are identified through grapheme-phoneme correspondence. Following this, meaning or comprehension occurs after a sequential identification of letters, words, phrases, clauses, sentences besides pronunciation. The grapheme-phoneme correspondence is the key feature of this model (Grabe, 2009; Hudson, 2007, in Bakke, 2010, p. 19). In fact, the importance of the linguistic features should not be denied as being necessary for achieving comprehension. Nonetheless, over-reliance on the formal features of the language, principally words, and structure would lead the bottom-up model of reading to come under attack for being defective and pave the way for the introduction of the cognitive approach to speculate about the process of reading comprehension.

Consequently, opponents of the bottom-up model exalt a new, yet another text-centric perspective which approves the idea that meaning is largely found in the text. Relevant to this, New Criticism has called for the close reading[9] of a text to understand its meaning (Brooks & Warren, 1960; Richards, 1921, in ibid.) through a *top-down* model of reading which is totally opposite to the bottom-up one. In the top-down model, the reader is required to reckon on already acquired syntactic and semantic knowledge to understand the text. One of the advocators of this model Goodman (1976), who describes the reading process as a psycholinguistic guessing game, stresses "the cognitive economy of linguistic information over graphemic information" (in Hudson, 2007, p. 37). Thus, unlike the bottom-up model, the top-down model puts very little emphasis on grapheme-phoneme correspondence.

Additionally, the top-down approach to processing reading accentuates the readers' background knowledge that may be used as a support to understand the text. Accordingly, this model of reading centres on the belief that good readers transcend the letter-sound

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[9] The term *close reading* was often applied to this approach, which implied that readers should stick close to the text as they tried to generate understanding (Pearson & Cervetti, 2015, p. 03).

correspondence through focussing primarily on meaning as they read quickly. As a consequence, comprehension following this assumption, is built when the text is taken into consideration as a whole block rather than when it is fragmented into its constituent parts. As denoted in Liu's words:

> "In this model it is evident that the flow of information proceeds from the top downward so that the process of word identification is dependent upon meaning first. Thus, the higher level processes embodied in past experiences and the reader's knowledge of the language interact with and direct the flow of information" (2010, p. 155)

Nonetheless, though the significance of the top-down model is undeniable, this same model is blamed for its drawbacks. In that, it relies heavily on the meaning brought by the reader to the text neglecting in such a way the very meaning that exists in the text itself. In this vein, Liu asserts that "instead of depending on meaning only, good readers may well markedly attend to graphic information, which may be more efficient than endeavouring to predict words based only upon context" (ibid). Moreover, the belief that comprehension is based on guessing and meaning prediction is not always possible especially in case of dealing with new topics that the reader has no or very little background knowledge about. Thus, it is noticeable that the effectiveness of the top-down approach to the processing of reading is only attainable within the context of some advanced readers who possess background knowledge on some given topics.

As a matter of fact, neither the bottom-up nor top-down model of processing reading sufficiently explains what really underpins the process of reading comprehension. The fact which urges the consideration of integrating both models has become inevitable. Consequently, due to the weaknesses of both the bottom-up and top-down model, the two models were brought together under the name of *interactive model* of reading (Rumelhat, 1976; Rumelhart & McLelland, 1981; Ur, 1991; Harmer, 2001; Tracey & Morrow, 2006). The development of this model is highly accredited to Rumelhart who believes in that reading requires parallel processing of both bottom-up and top-down frameworks where the higher level and the lower level can affect each other in a simultaneous way. As stated by Rumelhart and McLelland:

> "[P]rocessing in an interactive model of reading proceeds in the following way: the reader begins with a set of expectations about what information is likely to be available through visual input. These expectations or initial hypotheses are based on our knowledge of the structure of letters, words,

phrases, sentences, and larger pieces of discourse. ... As visual information from the page begins to become available, it strengthens those hypotheses that consistent with the input and weakens those that are inconsistent. The stronger hypotheses, in turn, make even more specific predictions about the information in the visual input. To the degree that these hypotheses are confirmed, they are further strengthened, and the processing is facilitated" (Rumelhart & McLelland, 1981: 37)

In 1980, Rumelhart's interactive model was adapted into the *Interactive-compensatory* model by Stanovich. The latter believes in that his model can minimize the difficulties found in the bottom-up and the top-down models. As claimed by the same author (1980) "interactive models assume that a pattern is synthesized based on information provided simultaneously from several knowledge sources. The compensatory assumption states that a deficit in any knowledge source results in a heavier reliance on other knowledge sources, regardless of their level in the processing hierarchy" (p. 63; in Liu, 2010, p. 155). Therefore, the two models are not only interactive in a linear way but also compensatory. In other words, for readers with sufficient knowledge about the topic of the reading material but have difficulties in word identification, the top-down model processing can supply them with relevant information. On the other hand, the bottom-up model can be workable for readers with little information about the given topic while word recognition does not present any problem for them.

Yet, pedagogically speaking both models are used interactively in nowadays reading instruction since current methodology textbooks, as maintained by Henkel, reflect "teaching bottom-up reading skills usually followed by instruction in top-down and strategic reading" (2006, p. 121). However, despite the importance of both models as processing skills in learning to read in an L2 (Birch, 2002; in ibid), they proved defective for being too text-centric while neglecting to handle other salient aspects of the reading comprehension process, mainly the reader and the context in which the reading activity takes place.

Nevertheless, the cognitive revolution that characterized the psychological field by the late 1960's and early 1970's empowered psychologists to speculate about:

"[t]he nature of the process that played out inside the brain during reading comprehension, as well as the nature of the storage mechanisms in memory. Elaborate accounts of knowledge acquisition during reading and of the organization of knowledge in memory became primary frameworks for

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understanding comprehension. At the same time, the reader became the centrepiece of the reading comprehension process." (Pearson & Cervetti, 2015, p. 04)

In this vein, Grinolos (1983), as cited by Acott (1985), states that the construction of the reading process can be interpreted in terms of five areas that need further elaboration: Cognition, Schema, Reader's technique, the Thesis and the Format. These cognitive-based perspectives gave birth to the schema theory model of reading comprehension.

II.1.1. Schema Theory Model of Reading:

One of the overarching theories in L2 reading, the schema theory, has had a noteworthy influence in reading instruction. Closely linked to the top-down processing, the schema theory emphasizes the significance of one's prior knowledge in acquiring new input, but unlike the top-down perspective, this theory depicts in details the reader's background knowledge as being of the essence in the process of reading comprehension. It illustrates how the ability of using one's knowledge and previous experience with the world sustains him/her in deciphering a text.

In their research on schema theory, Anderson & Pearson date its origin back to Gestalt psychology[10] (Wertheimer, 1912; Kohler, 1945; Koffka, 1932) as well as Bartlett (1902, 1932). According to Bartlett, the term 'schema' refers to "an active organization of past reactions, or past experiences ..." (1932: 201; in Anderson & Pearson, 1984: 8). The same authors also make reference to Ausubel's theory of meaningful learning which stands for that "already-known general ideas 'subsume' or 'anchor' the new particular propositions found in texts" (ibid., p: 11). It should be noted that Ausubel's theory was never labelled as a schema theory though it highly reflected its principles.

According to Wallace (1998), schema theory "is concerned with the way readers match up incoming data from the text with existing mental representations of situations, events or phenomena" (p. 45). Furthermore, as put in Pearson & Cervetti's words "schema theory emphasizes the role of the reader's existing topical and world knowledge in comprehension, examining how readers bring that knowledge to bear on text comprehension" (2015, p. 04). Concomitantly, schema theory assumes that newly acquired information is based on mental frameworks that have been created by previous experiences. In that, obtained knowledge is broken down into chunks then categorized to be stored into certain structure in memory for later

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[10] The term Gestalt literally means 'shape' or 'form'. Gestalt psychology focused holistic properties in the study of mental organization (Anderson & Pearson, 1984, p. 6)

recall. That recall of information in reading is highly impacted by the reader's schemata and facilitates comprehension. As explained by Anderson "a reader comprehends a message when he is able to bring to mind a schema that gives account of the objects and events described in the message" (1994, p. 469). Meanwhile, the process of comprehension involves "activating or constructing a schema that provides a coherent explanation of objects and events mentioned in a discourse" (ibid. 473). Moreover, for Anderson & Pearson (1984), "to say that someone has comprehend a text is to say that she has found a mental home for the information in the text, or else that she has modified an existing mental home in order to accommodate that new information. It is...interaction between old and new information" (p. 04). Consequently, learner's knowledge is built and comprehension occurs when schemata restructures itself through accommodating information that is newly added to the mental system.

On the other hand, schema theory can be categorized into two main types, namely: formal schemata (knowledge about the structure of a text) and content schemata (knowledge about the topic of a text), and both schemata help the reader to infer meaning from context and achieve comprehension. The first type, formal schemata, pertains to distinction between texts mainly in terms of structure, i.e. a text may be narrative, descriptive or expository.... To exemplify, a reading text may be a short story, administrative letter or a scientific article, and of course each of these genres has a particular structural organization. Knowledge about these different genre structures may facilitate their reading comprehension process because they will be able to predict what the text looks like, especially in terms of ideas arrangement. The second type, content schemata refers to knowledge about the subject matter of the text. Readers' familiarity with the topic they are supposed to read will make their understanding more productive and effective.

Moreover, though distinct, the possession of both schemata is indispensible for EFL readers to be able to construct meaning through connecting already acquired knowledge to the new information provided in the text. As stated by Gilakjani & Ahmadi "when students are familiar with the topic of the text they are reading (content schemata), aware of the discourse level and structural make up of the genre of the text (formal schemata) ... they are in a better position to comprehend their reading assignment" (2011, p. 144). In the same vein, Anderson claims that "a reader comprehends a message when he is able to bring to mind a schema that gives account of the objects and events described in the message" (1994, p. 469). On the other hand, failure at achieving either formal or content schemata would result in lack of comprehension or misunderstanding. In that "failing to activate an appropriate schema may be

due to the reader who does not possess appropriate schema anticipated by the author" (Carrell & Eisterhold, 1983, p. 560).

It is also believed that since schema is culturally-based, some readers may fail to understand a text because it does not connect to their cultural background. Thus, as maintained by Carrell & Eisterhold "one of the most obvious reasons why a particular content schema may fail to exist for a reader is that the schema is culturally specific and is not part of a particular reader's cultural background" (in Gilakjani & Ahmadi, 2011, p. 144).

Nevertheless, scholars have often proved that content schema is more significant than formal schema in that familiarity with the content area of the text is considered as being more effective in comprehension than familiarity with text structure. For this many researchers assure that when readers are able to activate suitable content schemata, they can overcome problems caused by lack of sufficient formal schemata (Joeg-dev & Anderson, 1979; Johnson & Carrell, 1981; Koh, 1986; Malik, 1990; in ibid). Accordingly, schema theorists focus on the activation of content schema as a fundamental aspect in the schema theory model.

Activation of background knowledge is very important for readers mainly in terms of making predictions about the content of the reading passage. Readers' inability to locate a schema that better fits a given text may render this text incomprehensible for them (Anderson, 1994). In this case, readers may be in need of their teacher to help them activate relevant schema to be able to understand the text. For Bransford (1994), lack of adequate background knowledge creates difficulties in text comprehension, and here comes the role of teachers to activate preciously acquired schemata and aid learners to incorporate isolated pieces of knowledge into a schema or to construct a new one. Similarly, Carrell asserts that teachers are responsible for "building new background knowledge as well as activating existing background knowledge" (1988, p. 248) in case it becomes impossible for their students to understand a text.

According to the aforementioned perspectives and ideas, it is evident that effective L2 reading pedagogy implies the paramount role of the teacher in activating and building learners' schemata. After selecting texts that cater for students' needs and preferences, teachers can proceed in the process of schema activation following three phases of activities:

- Pre-reading activities: at this phase students can be asked to think or write about anything they know concerning the topic presented in the print by using strategies like prediction,

previewing or brainstorming. This is mainly meant for ensuring that students have appropriate schema for comprehending the text.

- During-reading activities: students read the topic at the same time they link what they know to what they discover in the text to extract meaning and build upon their pre-existing schema; whereas the teacher's role is to guide and monitor the interaction between the student (reader) and the text. Note-taking is found so useful at this phase.

- Post-reading activities: at this last stage students should be able to integrate their background knowledge with the one provided in the text into a new schema structure. On the other hand, the teacher is expected to check students' comprehension through a wide range of questions that allow for various interpretations.

A noteworthy fact is that all the three phases are of paramount importance in schema activation and building, yet the pre-reading phase has to be given particular focus since it is the most significant for constructing background knowledge through the use of different devices like pictures, games, slides, ... etc. Thus, the students are pushed in multiple ways to externalize the most possible of what they know about the topic; hence schema is at its highest levels of activation.

As a matter of fact, no one denies the huge influence of schema theory in marking the turning point which revolutionized the historical development of diagnosing the pertinent elements that underpin the reading comprehension process. However, recent research has gone further beyond admitting the impact of background knowledge on readers' understanding to speculate about readers' control of their attempt to understand a text. This control is well known as metacognition (Black, 1992). Flavell interprets metacognition a being:

> "[O]ne's knowledge concerning one's own cognitive processes and products or anything related to them, e.g. the learning-relevant properties of information and data [...]. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of concrete goal or objective" (Flavell, 1976: 232; in Persson, 1994, p. 22)

Accordingly, metacognition can be understood in terms of the knowledge a person has about the cognitive processes required in comprehending the world as well as the ability of regulating, monitoring or controlling these processes. Metacognition in learning also involves high thinking skills that learners employ to plan, monitor, and evaluate their own learning (Livingstone, 1997).

It is composed of two aspects: metacognitive knowledge and metacognitive regulation (Flavell, 1979; Schraw, 2006; Vandergrift et. al., 2006). The former centres on learners' knowledge about cognition in general and it includes declarative, procedural and conditional knowledge (Brown, 1987; Schraw, 1998); whereas the latter revolves around metacognitive activities which aid learners in verifying and controlling their own learning or thinking, and it includes planning, monitoring and evaluation (Flavell, 1979; Whiteboard, et. al., 2009).

With reference to reading comprehension, planning involves the selection of adequate strategies that suit the reading task requirements; monitoring means the conscious understanding of comprehension progress as well as awareness of one's performance level during the reading task; while evaluating stands for judging one's competence of performance after the reading task (Bauserman, 2005; Woolforlk, 2013).

As such, reading is not only sampling the text, making hypotheses which are to be confirmed or rejected then making new hypotheses. Rather it is one's consciousness about what s/he is doing during the process of reading. The latter, following the metacognitive view, can be organized in terms of three important stages, namely: before reading, while reading, and after reading. Each of these stages involves the accomplishment of various activities. In the first stage, for example, readers are supposed to identify the purpose of the reading as well as the type of the presented print. The while reading stage demands distinguishing main idea from supporting or secondary ideas, locating the author's purpose for writing the text, among others. Lastly, in the after reading stage, readers are required to evaluate their reading performance through writing a summary of what they have just read for example (Mokhtari & Scheory, 2002). Thus, reading implies both cognitive and metacognitive functions as presumed by Persson in the table below:

Functions in reading	Components
Perception	-visual decoding -phonological decoding
Memory	-long-term storage -retrieval cues -working memory -lexical access
Cognitive knowledge	-factual prior knowledge

	-prior experience
	-knowledge about print and language rules
	-vocabulary
	-knowledge and use of reading strategies
Linguistic awareness	-phonology
	-language patterns
	-syntactic rules
Text awareness	-literary genre
	-text structure
	-figurative language, metaphors etc.
Self-awareness	-self-concept
	-own ability and knowledge
	-own cognitive functioning
Monitoring	-planning and predicting
	-learning strategies
	-decoding and comprehension strategies
	-purpose of reading
	-evaluation

Table 2.1.: Cognitive and metacognitive functions involved in reading (Persson, 1994, p. 12)

Yet, noteworthy is that the aforementioned cognition and metacognition-based models of reading comprehension are mainly derived from the constructivist approaches to learning "students must build knowledge for themselves" as well as constructivist pedagogies "teachers must avoid 'telling' students what they need to know and instead arrange conditions and activities to allow students to discover through systematic inquiry what they need to know to complete an activity, performance, or project" (Pearson & Cervetti, 2015, p. 06); i.e. it is the shift from the know-what to the know-how paradigm of pedagogy. Therefore, as put forward by Pearson & Cervetti "if schema theory evoked the metaphor of the reader as builder, then metacognitive work gave equal status to the reader as 'fixer', who must always be willing to repair the fragile process of meaning-making when it goes wrong" (ibid). Relevant to this, the

reader is always the centrepiece in these models of reading comprehension. Yet, these reader-centric models are to be challenged by more context-based approaches which lie just ahead and call for social construction of meaning.

Based on Vygotsky's (1978) "zone of proximal development"[11] and Bakhtin's literary theory (1981), reading researchers have shifted their attention from the cognitive to the social nature of learning through particular focus on the salient role of teachers and students' peers as active agents in facilitating learning for an individual (ibid, p. 07). Consequently, reading is no longer viewed as an isolated activity that can be accomplished through the reader-text interaction; instead it is "a social and cultural event around written language" (Hudson, 2007, p. 56). Eventually, the social context plays an undeniable part in the reading process.

Pedagogically speaking, these critical approaches have encouraged students to problematize and interrogate text by means of analysis and questioning. For this, Freebody & Luck (1990, 1999), as quoted by Pearson and Cervetti (2015, p. 09), suggest that "readers engage with text by taking on four roles:

- *Code breaker*: cracks the code or cipher by working from the material form of the text, such as print-symbol-sound relations and punctuation, mapping spellings to sounds and vice versa, and associating a representation of the word form with its common meaning.
- *Meaning-maker*: generates and integrates the communications of a text into a message, including the knowledge required to understand it.
- *Text user*: focuses on the pragmatics of use - what function a text serves in the social contexts in which reading occurs.
- *Text critic*: takes a critical stance, unpacking the social, economic, ideological, moral, emotional, and political assumptions behind a text and the consequences of using it.

The aforesaid roles are the characteristic features of Freebody and Luck's Four Resources Model of reading comprehension.

Ostensibly, these authors' approach tries to create a balance between old theories of reading comprehension, to wit: text-centric and reader-centric, with recent socially-driven perspectives of reading which are present in context-centric models. In that the former models are concerned mainly with extracting the very meaning that is revealed in the reading material

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[11] This refers to the difference between the learning a child can accomplish on her own and what she can accomplish with the help of others (such as a teacher, mentor, parent, or knowledgeable peer) (in Pearson & Cervetti, 2015, p. 6).

whereas the latter revolves around the multiple representations constructed by the reader while interacting with a text in a given social context. Eventually, Freebody and Luck's multi-perspective model synthesizes previous theories of text comprehension and integrates recent sociocultural theories and their implications in the reading pedagogy predominantly corresponding to the critical analysis of the text or what is often referred to as critical reading.

Last but not least, reading can by no means be considered as a simple activity. Rather it is a multifaceted process of meaning making whose construction involves several functions which are interactively intertwined, to wit: visual decoding, linguistic awareness, text structure awareness, cognitive knowledge, self-regulation consciousness, among others.

II.2. From Comprehension-based to Critical Reading in ESP: Beyond Literal Understanding of the Scientific Text:

In this modern world, citizens are inclined more often than not to deal with endless complicated issues, and they are urged as never before to make wise decisions to respond to multiple problems they face in their daily life. Nevertheless, to deal with this effectively, citizens must reveal a capacity to evaluate critically everything they see, hear, and read (Taglieber, 2000). Moreover, the wide spread of various sources of information in its different forms has imposed the possession of critical reading skills as a must to be able to select what is useful from what is useless. In response to this, educationists have determined the concept of critical reading to be the salient attribute to 21st century Higher Education; hence its involvement in all fields of study including ESP. As such, ESP learners are extremely required to go beyond the literal understanding of their scientific documents through developing critical reading abilities that would foster their autonomy and motivation towards academic achievement and lifelong learning.

II.2.1. Towards a Pedagogically Workable Definition of Critical Reading:

It is believed that the origin of critical reading goes back to Halliday's original work 'Systemic Functional Grammar' (1994) and Critical Discourse Analysis (CDA) which sees discourse as socially constitutive as well as conditioned (Demiroz, 2007). For Halliday (1994), a text is "an interactive process and a social exchange of meanings" (p. 41). This view, together with the idea of "text in context" of CDA, constructs the basis for critical reading. The latter, in fact, has often been approached from two different perspectives: the first one relates to critical thinking while the second corresponds to critical discourse analysis. In the present study, it is

critical reading which is defined from a critical thinking perspective that is accentuated most because the CDA perspective "historically and systematically ...is part of a broad spectrum of ...*critical studies* [12]in the humanities and the social sciences, e.g. in sociology, psychology, mass communication research, law, literature and political science" (Dijk, 1995, p. 17). Consequently, CDA is not considered thoroughly in this study since the main aim of our research consists in promoting critical reading strategies among engineering students in the scientific field of hydraulics rather than indulging into discourse analysis of scientific texts.

Though, pedagogically, it is often confused with reading comprehension, critical reading has its own principles and pedagogical framework. Yet, attempts at identifying the concept of critical reading or critical literacy as it is usually referred to, vary at a large scale. According to Combs, R. (1992), for example, "critical reading is reasonable, reflective thinking focused on deciding what to believe or do." (p. 03). It is also, "an extensive process which uses several levels of thought simultaneously" (ibid, p. 04). These levels of thought are identified by Taglieber as, for instance, "*analysis*[13] – the clarification of information by examining the component parts; *synthesis* – the combining of relevant parts into a coherent whole; and *evaluation* – which involves establishing standards and then judging ideas against the standards to verify their reasonableness" (2000, p. 16). Thus, abilities like questioning, analysing, synthesizing, and making logical evaluation and judgements on the document read are the cornerstone of reading critically.

Concomitantly, Dale (1965) distinguishes between three levels of reading. The first level, which is simple and uncritical, is *reading the lines*[14] (literal comprehension); it is mainly a duplication of what has been read. The second one is *reading between the lines* and it represents a higher level of reading which requires drawing inferences from what is read. Then, the third level revolves around "evaluation and application of what is read and requires vigorous, critical judgment. It is *reading beyond the lines*" (p. 195). This is critical reading. The latter, for the same author, can also be identified in terms of the following characteristic features:

1. *Critical reading is independent reading*: For Dale, after training in critical reading, the critical reader has to become self-reliant, and self-directed as an independent learner rather than teacher-directed.

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[12] Author's italics
[13] Author's italics
[14] Author's italics

2. *Critical reading is problem-centered*: This implies the vital role of the critical reader in finding out the problem, the great issues which cannot be adequately stated in this complicated world.

3. *Critical reading is analytical and judgemental*: Reading critically is based on analysis, judgement, and noting the strengths and weaknesses of the reading material to indicate directly or indirectly whether it is worth reading or not. It is examining hidden assumptions. Here, as maintained by Dale, the critical reader "must present his best judgements and demonstrate his awareness of critical standards" (p. 196).

4. *Critical reading is based on a stubborn effort to get at truth*: This implies that the critical reader must be conscious of any obstacle that may come in his way while trying to discover the truth.

5. *Critical reading is creative, imaginative, non-conformist*: This characteristic involves the critical, creative reader to be "willing to modify previous beliefs" and "flexibly open to change" since "he has learned to live with uncertainty, to tolerate ambiguity" (p, p. 197).

6. *The critical reader associates with the best minds of all generations*: This is achievable, according to Dale, only through reading "thoughtfully, analytically, judgementally, critically" (ibid.)

7. *Critical reading is an involving participatory experience*: which engages the critical reader into dialog with the author.

8. *The critical reader is sensitive towards and has acquired an excellent vocabulary*: This involves the critical reader's awareness of language use and style. In reading critically, the reader must be able to make distinction between meanings of words, e.g.: irony, sarcasm, and satire.

9. *The critical reader reads to remember, not to forget*: According to Dale, what is critically read is worth remembering especially through sharing as he emphasized "knowledge unshared is knowledge forgotten" (ibid, p. 199). Therefore, Dale concludes "critical reading is disciplined reading by persons who have convictions about something"; persons who read "to fill time" and not "to kill time".

Ostensibly, Dale has thoroughly approached the concept of critical reading, especially through the presentation of its characteristics which really reflect how critical reading and the critical reader have to be. These characteristics, however, though valuable, bear some exaggeration. For example, the statement of the fifth feature which maintains that the critical creative reader has to be "willing to modify previous beliefs" can by no means be justified,

particularly when it comes to religious beliefs. Dale forgot to include the exception that some beliefs can never be modified, at least for us –the Muslim community. Thus, it is worth to restate here that the critical reader has to be cautious of some writings that try to challenge his own beliefs.

From his part, McDonald (2004) views critical reading in terms of going beyond the typical information processing of reading or reader response which may involve outlining and summarizing main ideas of the text or description of reader's impressions about a text (in Tomasek, 2009, p. 127). The reading referred to by McDonald is in fact what is known as literal understanding of the text. The latter, though it makes the basis of critical reading is also different from it as maintained by Phillips and Sotiriou (1992, p. 268) in that:

> "(in literal reading) your purpose for reading is mainly literal comprehension: to locate main ideas and supporting details as well as the structure of written material most of this material was one-dimensional. In critical reading, however, your purpose goes beyond surface content. You need to do more: to analyse, critique, react, understand more deeply. This reading material is usually more complex than most of your daily reading. This type of material is multidimensional. You may have to read this material two or three times before you can effectively discuss and write about it." (in Huijie, 2010, p. 46)

However, this would never mean that literal reading should not be taken into consideration; rather it must be emphasized as well because it is the starting point of critical reading, i.e. without comprehension there would be no deep analysis. Put in Huijie's words "full literal comprehension is CR's threshold" (ibid.).

Furthermore, critical reading is also construed by Priozzi (2000: 325) as being:

> "Very high-level comprehension of written material requiring interpretation and evaluation skills that enable the reader to separate important from unimportant information, distinguish between facts and opinions, and determine a writer's purpose and tone. It also entails using inference to go beyond what is stated explicitly, filling in information gaps, and coming to logical conclusions." (in ibid, p. 43)

With respect to nonfiction, Maker and Lenier (1986:138) define critical reading as follows:

> "Critical reading in nonfiction is the process of making judgements about what you read and deciding what to believe and what not believe. Critical reading enables you to size up the author's arguments and to evaluate how well he or she

supports them so that you can draw your own conclusions. Critical reading requires both literal and inferential comprehension. If you do not understand the facts and what they imply, you are not in a position to make any judgements" (ibid.)

In fact, the above definitions depict the concept of critical reading particularly in terms of the various skills that a critical reader should possess. In that some authors while endeavouring at conceptualizing the framework of critical reading, they focus on the characteristic features of the critical reader. As explicitly put forward by Roe et al. (1991), critical reading is a task which "should be approached with an open-minded, problem-solving attitude. Critical readers should constantly ask questions about the text they are reading" (in Combs, 1992, p. 4).

On the other hand, critical reading can also be interpreted with reference to the development of higher-order thinking skills or critical thinking as it is often referred to. Though some researchers try to distinguish between critical reading and critical thinking, both concepts, as a matter of fact, overlap to a great extent, indeed. Critical thinking is defined by Roggeiro (2012) as the mind's examination and evaluation of what it has produced through making judgements and adding refinements where necessary. Another important definition, belongs to Ennis (1991, p. 474), wherein critical thinking is viewed as "reasonable reflective thinking that is focused on deciding what to believe or do", primarily in terms of "formulating hypotheses, alternative ways of viewing a problem, questions, possible solutions, and plans for investigating something". Clearly noticed is that what Ennis views as the definition of critical thinking is the same as what other authors consider to be the definition of critical reading (Combs, 1992; Maker and Leneir, 1986), which justifies the fact that limits between critical reading and critical thinking are vague. From his part, Stenberg (1985, p. 46) also defines critical thinking as "the mental process, strategies and representations people use to solve problems, make decisions, and learn new concepts" (in ibid, Pp. 473-74).

Considering the aforementioned definitions one might undoubtedly perceive a very close similarity between critical reading and critical thinking. For this, Commeyras (1989) posits that "critical thinking which involves reasoning, is the process the reader uses to determine which interpretations are consistent with textual evidence and background knowledge" (P:02). In the same vein, Newton (1985, p. 26) also believes in that "to read critically is to think critically. Critical thinking is a manner of assimilating and processing information and evaluating ideas. (...) Our concern as teachers of reading is to encourage critical thinking with respect to the written word" (in Taglieber, 2000, p. 17). Relevant to this, it can be assumed that critical

thinking covers a wider range of aspects of the human life as it relates also to what is heard or seen; whereas critical reading is usually explained or understood within the framework of the written word or all what is documented.

From another perspective mainly in recent research, some authors differentiate between two distinct trends of critical reading: critical reading for academic success or achievement and critical reading for social engagement (Manarin, et al., 2015; Malcolm, 2017). Critical reading for academic success, as pointed out by Manarin, et. al. (2015, p. 4) revolves around the major skills below:

a. Identify patterns of textual elements

b. Distinguishing between main and subordinate ideas

c. Evaluating credibility

d. Making judgements about how a text is argued

e. Making relevant inferences about the text (in Malcolm, 2017: 53)

On the other hand, reading critically for social engagement entails the critical comprehension of texts for social purposes. The latter, as maintained by Wallace (2003, p. 9), implies that "readers and writers enact their roles as members communities" (in ibid). This tradition of critical reading is embedded in critical pedagogy which is derived from the critical theory that is based on questioning social inequalities and injustices (Siegel and Fernandez, 2000). Undoubtedly, the ultimate aim of such critical reading is to develop rounded individuals who are able to bring about social change and improvement towards the best. The key elements that underpin reading critically for social purposes are:

a. Sifting through various forms of rhetoric

b. Recognizing power relations

c. Questioning assumptions

d. Engaging with the world

e. Constructing new possibilities (Manarin, et al., 2015, p. 6; in ibid.)

Ostensibly, both traditions of critical reading –for academic success and for social engagement- share the same values. For that both call upon the critical reader to deeply analyse textual content to extract then construct meaning with reference, of course, to contextual considerations. Both trends require the critical reader to question assumptions inferred from a given text and evaluate the credibility of these assumptions in respect to one's own schemata. As

highlighted by Malcolm "whether a student is reading critically for academic purposes or for social engagement, not only comprehension, but also analysis, interpretation, and evaluation should be present" (ibid, p. 54).

Pedagogically speaking, like critical thinking, critical reading instruction - regardless its tendencies – must centre on the development of higher order thinking skills or key critical reading abilities like: questioning, analysing, problem solving, synthesizing, judging, evaluation ...etc. These are the typical skills that any foreign language learner should acquire, especially nowadays with the continuous progress of information technology which has made huge numbers of reading materials augmenting at an astonishing pace. Consequently, fostering critical reading abilities among EFL learners in general and ESP students in particular, mainly in Algeria, has become a must that should never be delayed. Considering the concept of critical reading as an effective pedagogical component in Algerian Universities has become an emergent need and an inevitable feature of reality, peculiarly in the present world where critical reading is conceived as the salient attribute to 21st century Higher Education.

II.2.2. Critical Reading as the Salient Attribute to 21st Century Higher Education:

The fast pace of change in the past decade such as continuous demographic growth, rapid technological progress, and essentially globalization, has raised many challenges that urged higher education stakeholders to look for new educational trends and perspectives. Relevant to this, the role of higher education has been revised from different aspects and the issue of educational system reform has become of an essence to grapple with this fast advancing world. Coping with this context, the inauguration of Bologna Process by the European countries is considered as one of the unprecedented initiatives that underpin the new framework of the 21st century enterprise of higher education. The latter, and thanks to the Bologna Process, is redefined to embody new educational perspectives, visions, goals and objectives that can effectively respond to 21st century uprising challenges. Mobility, employability, lifelong learning and particularly critical literacy are to be coined as the novel globalized currency of the 21st century higher education.

While celebrating the 800th anniversary of Paris University (the Sorbonne) ministers of education from France, Italy, Germany, and the UK discussed the possibility to establish a common set of reform that should at first place remove barriers as well as construct a new

European educational framework. The discussion resulted in the Bologna Declaration or as also known the Bologna Process which called for the creation of a European Higher Education Area (EHEA). The major principles that sustain the Bologna Process include:

- The adoption of a system of easily comparable degrees essentially based on two main cycles: undergraduate and graduate.
- The implementation of a common system of credits for promoting widespread student mobility, The European Credit Transfer System (ECTS).
- The creation of a policy directed to overcoming obstacles and assuring mobility of students', teachers, researchers, and administrative staff.
- The promotion of European cooperation to assure the quality of higher education through the development of comparable criteria and methodologies.
- The development of the necessary European dimensions in higher education, particularly through curricular development, inter-institutional cooperation, mobility schemes and integration programs of study, training and research. (Aguilera-Barchet, 2012, p. 13)

The fundamental objectives of the Bologna Process centre on the creation of an educational system that caters for the needs of a changing labour market through the realization of certain challenge concepts like mobility, employability and lifelong learning that have been raised by EHEA member states. For example, encouraging students' mobility becomes one of the priorities of European higher education. As it is often perceived, students' mobility stands for "crossing country borders for the purpose of or in the context of tertiary education" (Richter and Teichler, 2006, p. 4) by means of, for instance, grants, scholarships, and conventions. However, despite its importance, students' mobility has been always faced by serious obstacles like the difficulty of getting a visa especially for those coming from outside Europe.

Furthermore, employability has also been considered among the fundamental pillars of the Bologna Process. The concept of employability has often been linked to "an individual preparedness for work, capacity to manage work and retain his or her job, continued career development, and potential for mobility in the labour market" (Nilson and Nystrom, 2013, p. 174). This perspective seeks not only to guarantee employment for students after graduation but even to secure longstanding labour market supply with relevant competences (in terms of knowledge and skills) to keep existing in the modern evolving world as well as to augment its effectiveness and productiveness. As such, employability caters for bridging the gap between the world of employment and higher education institutions through designing and maintaining

pedagogical programs and establishing educational goals and objectives that respond efficaciously to the requirements of the labour market. Consequently, both economic prosperity and a better higher education can be achieved simultaneously.

Nevertheless, employability imposes certain skills and qualities on nowadays employees. According to Robinson (2000), employability skills are threefold:

1. *Basic academic skills*: these relate mainly to the ability to read and understand what is read, the ability to listen and comprehend given instructions, the ability to react and reply effectively both orally and in writing, besides the capacity to do fundamental arithmetic calculations correctly.
2. *Higher-order thinking skills*: these skills embody the capacity to reflect critically, analyse, synthesize, judge, evaluate, solve problems, make sound decisions... etc., in addition to the ability to utilize technological devices in an efficient and innovative way.
3. *Personal qualifications*: it is highly required for the present world employee to be responsible, self-confident, honest, respectful, flexible, motivated, and apt to integrate into team work.

The above mentioned skills are undoubtedly pertinent to the concept of lifelong learning which is also among the priorities of the Bologna Process. Lifelong learning implies "permanent and continuing education" (Pieck, 2002, p. 144), which should not be aimed at accumulating information. Education, instead, must be based on training learners to learn how to learn. Not only this, lifelong learning transcends formal education of schools and universities or any other official institution to non-formal contexts like the workplace or home. It is a continuous process of renewing one's competences and abilities throughout life to accommodate to this ever changing universe. With reference to the Bologna Process, lifelong learning is "all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competence, within a personal, civic, social and/or employment-related perspective" (Fredrikson, 2003, p. 532). Besides the traditional learning skills (reading, writing, and arithmetic), lifelong learning emphasizes the acquisition of new skills like ICT, foreign languages, entrepreneurship and social competence. In such a way, lifelong learning is viewed as "a right of the individual, not only to get a better job, but also as a way of self-fulfilment" (ibid, p. 537).

Coping with the above context, many pedagogical conceptualizations have to be reconsidered and redefined within the new educational framework. Teachers' and students' roles have to be revised, and teaching methodologies are to be modernized. Learning is no longer

storing quantities of knowledge nor acquiring listed information by heart. Learning has become a problem solving process that needs higher order thinking skills to deal with. Learning is investigating, analysing, interpreting, discovering, evaluating; it is decision making; it is self-development; it is critical literacy that can be identified as the salient attribute to the 21st century higher education.

On the other hand, the ultimate aim of higher education institutions are redirected towards educating conscious, autonomous and responsible citizens committed to national and international rules, capable of dealing with the challenges of the century of lifelong learning (Beirut Declaration on Higher Education in the Arab States, p. 45). Consequently, nowadays teachers are no longer conceived as founts of knowledge and the students are no longer perceived as empty vessels ready to be filled in with anything. Nowadays, classrooms are learner-centred where emphasis is made on 'how to learn' rather than 'what to learn'.

Ultimately, this new paradigm shift in the vision of higher education imposes a pressing need to plan up-to-date guidelines that correspond with a student-centred pedagogy. To accomplish this, "curricula need to be recast so as to go beyond simple cognition, mastery of disciplines and include the acquisition of skills, competencies and abilities for communication, creative and critical analysis" (World Conference on Higher Education, p. 4). In fact, the development of different academic and professional skills like problem solving, creative and critical analysis necessitate enhancing students' ability to analyse and evaluate critically everything occurs in their daily life. Students have to be aware that achievement can only take place when they are able to comprehend things which must to be approached with a critical eye that can read beyond the literal meaning. Eventually, the promotion of these critical skills is not confined to a particular domain of study, rather it concerns all fields in higher education and ESP is concerned as well.

II.2.3. Critical Reading for ESP Learners: a Requirement for Understanding the Scientific Text:

The reading skill as it has already been argued is of a paramount importance for language learners in general and EFL in particular. Furthermore, educationists have often emphasized that in ESP programs reading is highly commanded as the most needed skill by students since they have to read large amount of academic texts in English which is the language of science today. As put forward by Dubin "in language programs designed to meet specific needs, many teachers

realize that the skill students need most is reading" (1986, p. 125). However, reading to get the literal meaning of the scientific text is not enough, particularly for university ESP students. These students have to go beyond the surface meaning of their documents towards reading critically through analysis, interpreting, judging, and evaluating the scientific text.

According to available literature, TALO, TAVI and TASP are the most prominent acronyms that have characterized the different approaches to reading in EFL for specific purposes. TALO and TAVI were first coined by Johns and Davies (1983). The former stands for using Text as a Linguistic Object while the latter refers to using Text as a Vehicle for Information. Relevant to this, the TALO approach to reading focuses mainly on developing language aspects particularly grammar and vocabulary. However, from a TAVI perspective, information within the text is viewed as being more significant than the structure of the text or language. For this, students are required to grasp the meaning of text instead of (or before) understanding its linguistic composition. TAVI is based on predicting the content of the text, answering comprehension questions, summarizing the main ideas, among others. Furthermore, in designing the TALO-TAVI as "a framework for classroom interaction in which the students work in small groups to puzzle out the meaning of text" (p. 01), Johns and Davies confirm that "only at the end of the [TAVI] activities should the teacher do what is done first with the TALO method, which is to explain whatever residue remains of difficult words and expressions" (p. 11). In addition to TALO and TAVI, Clandfield (2005) suggests TASP which means using Text as Springboard for Production or Text as a Stimulus for Production. Put another way, in TASP, the text is used as a trigger for another task, usually a reading or writing task. For example, tasks may include discussing issues raised by the text, writing a response to the text ...etc.

Considering the above perspectives, it can be assumed that TALO, TAVI and TASP should be looked at as complementary rather than different approaches to reading. In that, in the ESP classroom, teachers ought not to overemphasize language (TALO) at the expense of content/information of the text (TAVI) and vice versa. Additionally, teachers have to seriously think about other ways to use the text, beyond the development of linguistic competence and understanding content, especially in higher education. As proposed by Clandfield (2005), a typical text lesson in the 21st century should combine the three approaches and proceed as follows:

- Start with TAVI-type activities, so that students understand the information in the text.
- Then look at the language in the text in closer detail, through TALO-type activities.

- Finally, close the lesson off with a TASP-type activity.

Nevertheless, it is worth noting that reading comprehension in ESP, especially when dealing with scientific and technical knowledge involves information about the scientific document through which this knowledge is communicated. As a matter of fact, the belief that scientific texts are informationally dense, syntactically complex, and linguistically and conceptually domain specific (Atkinson, 2001; Halliday, 1988; in Abdel-Hamid and Samuel, 2012, p. 509) is taken for granted. Following Abdel-Hamid and Samuel (ibid.), according to Halliday (1988) the English language of science has particular features which classify it as scientific English and include nominalization of verbs and adjectives (e.g. move→ motion; deep→ depth), extended nominal groups, causal and reasoning verbs, impersonal language, passive constructions, and technical vocabulary.

Furthermore, for Walsh (1986), the scientific text includes three significant parts: the linguistic, the rhetorical, and the conceptual as explained below:

a- *The linguistic part of scientific texts*: this part underpins the language of scientific texts that is particular in any subject area. In other words, every technical area or each section of science has its specific store of vocabulary that it employs regularly. There are also some special linguistic features which are widely used in scientific texts though not exclusive to them, for example: the passive voice, present simple, complex subjects and simple verb forms, modal verbs ...etc.

b- *The rhetorical part of scientific texts*: this implies mainly as put forward by Walsh "the organization of the language, the presentation of the knowledge, and the writer's assumptions about the reader" (ibid: 145). Rhetorical organization of scientific texts is reflective of the scientific method which is usually precise and concise and which is often presented not only through paragraphs but even through devices like diagrams, tables, graphs, maps ...etc. the rhetoric of scientific texts is also shaped by the writer's assumptions of the reader's reading competence which is generally expected to be of high level.

c- *The conceptual part of scientific texts*: According to Walsh, the scientific writer always makes assumptions about the conceptual knowledge of the subject matter that the reader brings to the text.

Coping with the abovementioned characteristic features of the scientific text, scientific materials involve attentive and thoroughgoing reading. Relevant to this, a good reader of a scientific document should reveal a set of skills and strategies. While elaborating on a scientific

reading program, Wiriyachitra (1986) posits that reading programs designed to science-students in ESP context should introduce these students to four distinct aspects of reading: skimming, scanning, comprehensive reading and critical reading. Skimming according to the same author helps the students read quickly but selectively to get a general overview of the material, while scanning aids the students to find out specific information in the material. On the other hand, comprehensive reading is also significant whereby students have to read slowly and carefully for the purpose of extracting required information and grasping the material. As stated by Wiriyachitra, reading a scientific document comprehensively involves the student to learn and practice the following: vocabulary recognition, sentence comprehension, paragraph analysis, interpretation of illustrations.

Nevertheless, skimming, scanning, and comprehensive reading, though fundamental skills in accomplishing the reading process, are not enough to say that the student comprehends the scientific text. As put in Wiriyachitra's words "understanding all the sentences and paragraphs does not mean that the student thoroughly understands the reading material" (p. 150); so this student "must learn to *read critically*[15]". Therefore, critical reading is a requirement for understanding the scientific text. Critical reading enables the ESP student "to understand the author's purpose, to distinguish facts from opinions, to judge the reliability of the opinions presented, to interpret the statements further, and to draw inferences or implications from what is presented" (ibid.). As such, critical reading enables the students to go beyond the literal meaning of the scientific text. It helps the student to avoid accepting everything given to them at face value. It also reinforces the student's ability to read with a critical eye that can judge not only what is presented in the text but even what is neglected to be presented.

From their part, Oliveras, Marquez, and Sanmarti identify six elements of science critical reading which include:

1- Identify the main ideas of the text
2- Identify the writer's purpose
3- Identify the writer's assumptions and viewpoints
4- Formulate a scientific question which the writer answers in the article or design a scientific experiment to verify the information in the text.
5- Identify data and evidence given in the text.
6- Draw conclusions based on the evidence.

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[15] Authors' italics

Eventually, the importance of critical reading for ESP learners is undeniable especially among those who are dealing with scientific documents. Critical reading of scientific texts requires reader's analysis, interpretation, and evaluation of the reading material to be able to distinguish relevant from irrelevant information, make difference between fact and opinion, determine the authors' purpose, compare and contrast various readings dealing with the same subject. Additionally, critical reading of scientific documents is a prerequisite for students to become critical thinkers who are competent to judge everything they see, hear, or read in their field of interest. Reading scientific texts critically certainly involves students' awareness of critical reading strategies, and how and when these can be used in the critical reading process.

II.3. Promoting Critical Reading Strategies in ESP: Crucial Issues and Implications

Clearly observable is that recently there has been a significant move in language learning strategy research where the emphasis that has been long made on teachers and teaching is now shifted to learners and learning. As assumed by Nyikos and Oxford (1993, p. 11) "learning begins with the learner". This recent shift of interest is mainly concerned with how new information is proceeded through to be acquired by learners, and what strategies can be used to comprehend, learn and remember this newly acquired information.

Therefore, this section tries to give an overview on language learning strategies. It also highlights the significance of developing language learning strategies among ESP learners, with a particular focus on critical reading strategies. The latter are discussed in terms of identification, classification, and measurement. Light is also shed on the importance of integrating critical reading strategies into ESP instruction through spotlighting their role in promoting students' critical reading skills, heightening students' motivation, and enhancing their academic achievements. The last sub-section puts forward the rationale for explicit instruction in critical reading strategies for Algerian ESP students.

II.3.1. Language Learning Strategies: an Overview

Any learning process is subject to the learner's way or manner in approaching the subject learned in order to accomplish the ultimate goal of learning. Perhaps, what matters most importantly among learners is 'what' to use and 'how' to use it in order to achieve the purpose of learning. In fact, all learners, successful and unsuccessful, use various ways or strategies though to varying degrees and regardless of their effectiveness. However, the expression 'learning

strategies' has been gaining momentum just recently and its exploration has increased with the significant increase of language learning interest all over the world.

Nevertheless, it was not until the 1970's that research in the field of foreign language education started moving attention towards language learning strategies, especially when focus shifted from considering the product to the process of language learning. Consequently, language learning strategies (LLS) have received a considerable amount of importance to occupy a pivotal status in the field of foreign language research, particularly after developments in cognitive psychology. In fact, first studies were mainly interested in successful learners and the identification of their language learning habits and behaviours (Rubin, 1975; Stern, 1975; 1983). The fundamental concern has been about "identifying what good learners report they do to learn a second or foreign language, or, in some cases, are observed doing while learning a second or foreign language" (Rubin and Wenden, 1987, p. 19, in Hismanoglu, 2000, p. 01), which might help describing and classifying the language learning patterns of learners. However, by the 1980's, the emphasis of research shifted attention towards conceptualizing language learning strategies predominantly in terms of their identification, classification framework and measurement (O'Malley et al., 1985; O'Malley, Chamot and Walker, 1987; Oxford, 1990; Andrew, 1998; 2006; Chamot, 2004).

Though widely explored by various scholars, there is still no consensus on the definition of language learning strategies. One of the first pioneers in the field of LLS, Rubin defines LLS as "the techniques or devices which a learner may use to acquire knowledge" (p. 43, in Griffiths, 2004, p. 02). Nonetheless, in Stern's view the term learning strategy is distinct from learning techniques in that the former is related to "general tendencies or overall characteristics of the approach employed by the language learner", whereas the latter refers to "particular forms of observable learning behaviours, more or less consciously employed by the learner" (1983, p.405). This controversy in terminology use has been highlighted by Griffiths explaining that instead of strategy some authors prefer other terms like learning behaviours (Wesche, 1977; Politzer and McGroarty, 1985), techniques (Stern, 1983), and tactics Seliger, 1984), yet the term strategy is widely used by many prominent language researchers since as Rubin (1975) employed it "in perhaps the earliest study in this area and it enjoys the widest currency today" (Larsen-Freeman and Long, 1991; 199, in Griffiths, 2004, p. 01). Therefore, the use of the term language learning strategies is nowadays gaining momentum at a large scale though consensus on its definition is seldom achieved.

In a too general definition, Allwright and Balley state that learning strategies are "what action learners take to try to master the target language" (1991, p. 141). Additionally, as cited by Ellis (1984), language learning strategies according to Tarone are "the means by which the learner processes the L2 input in order to develop linguistic knowledge. Learning strategies can be conscious and behavioural (e.g. memorization or repetition with the purpose of remembering), or they can be subconscious and psycholinguistic (e.g. inferencing or overgeneralization)" (p. 13). From her part, Oxford makes the difference between learning styles and learning strategies. According to her, learning styles are those "general approaches, for example, global or analytic, auditory or visual – that students use in acquiring a new language or in learning any other subject" (2003, p. 02). On the other hand, learning strategies, for the same author, are defined as "specific behaviours or thought processes that students use to enhance their own L2 learning" (ibid, p. 08).

It is quite noticeable that what Stern defines as learning strategies for Oxford are learning styles. The latter, for Oxford are too general learning habits mainly shaped by the learner's personality besides other physical, social and affective factors. As put forward by Keffe (1979), learning styles are those "cognitive, affective, and physical traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (cited in Brown, 2000, p. 114). The concept of learning styles is also explored by Brown who defines it in terms of the relationship of cognitive styles (which underpin the link between one's personality and cognition) to an educational context, where both affective and physiological components are blended together. Additionally, learning strategies according to Brown are "those specific 'attacks' that we make on a given problem. They are the moment-by-moment techniques that we employ to solve problems posed by second language input" (122), and this is certainly what justifies the contemporary view of language learning as a problem solving process.

With reference to the aforementioned approaches to learning styles and learning strategies, it can be assumed that learning styles are those general characteristics which the language learner brings to the learning context through his/her personality, while learning strategies are primarily particular behaviours taken by the learner to adapt to or manage throughout the process imposed by the learning context.

In fact, interest in language learning strategies has been growing since research in second language acquisition proved that no simple teaching method has been found successful in

acquiring a second language. As maintained by Brown "certain learners seemed to be successful regardless of methods or techniques of teaching" (ibid, p. 123). Therefore, considering individual characteristics, mainly personal and cognitive, would be more effective than trying to find the best way of teaching a foreign language. Accordingly, the pioneering work of Rubin (1975) and Stern (1975) tried to depict fourteen characteristics of successful language learners. For instance, as cited by Brown, for Rubin good language learners:

1. Find their own way, taking charge of their learning.
2. Organize information about language.
3. Are creative, developing a 'feel' for the language by experimenting with its grammar and words.
4. Make their own opportunities for practice in using the language inside and outside the classroom.
5. Learn to live with uncertainty by not getting flustered and by continuing to talk or listen without understanding every word.
6. Use mnemonics and other memory strategies to recall what has been learned.
7. Make errors work for them and not against them.
8. Use linguistic knowledge, mainly knowledge of L1 in L2 acquisition.
9. Use contextual cues to help them in comprehension.
10. Learn to make intelligent guesses.
11. Learn chunks of language as wholes and formalized routines to help them perform "beyond their competence".
12. Learn certain tricks that help to keep conversations going.
13. Learn certain production strategies to fill in gaps in their own competence.
14. Learn different styles of speech and writing, and learning to vary their language according to the formality of the situation.

This set of good language learners' characteristics was an inspiration for many scholars to investigate good language learning strategies that would pave the way for successful second language learning.

Furthermore, in 1981, Rubin set out three categories of strategies that can contribute directly or indirectly to the learners' language learning process. These include learning strategies, communication strategies, and social strategies:

a. *Learning strategies*: These are of two types which directly influence the learner's constructed language system. The first type concerns cognitive learning strategies which are composed of: clarification/verification; guessing/inductive inferencing; deductive reasoning; practice and monitoring. The second type refers to metacognitive learning strategies which revolve around planning, establishing purposes, prioritizing, and self-regulation in order to manage or self-regulate the process of language learning.

b. *Communication strategies*: These are primarily used to compensate for problems or difficulties (e.g. misunderstanding) confronted while communicating in the target language. These strategies are indirectly linked to language learning.

c. *Social strategies*: These strategies are also less directly related to the process of language learning since they primarily concern the activities that may help learners to be exposed to the target language. Unlike learning strategies, communication strategies and social strategies are less effective on language learning since they "do not lead directly to the obtaining, storing, retrieving, and using of language" (ibid: 02).

Furthermore, Rubin's categorization of strategies would provide the basis for more advanced contributions of LLS identification and classification.

II.3.1.1. Classification of Language Learning Strategies:

After the attempt of Rubin, many scholars have delved into investigating the taxonomy of language learning strategies (O'Malley et al., 1985; Oxford, 1990; O'Malley, Chamot, and Walker, 1987; O'Malley and Chamot, 1990; Stern, 1992) among others. In fact, the majority of the contributions in language learning strategies classification reflect nearly the same principles of categorization. However, the classifications of O'Malley et al. (1985) and Oxford (1990) are considered by many researchers as the most prominent contributions in the field. Both classifications are discussed hereinafter:

A. Classification of Language Learning Strategies by O'Malley et al. (1985):

Sharing Rigney's (1978) view, O'Malley et al. (1985) define learning strategies as "operations or steps used by a learner that will facilitate the acquisition, storage, retrieval or use of information" (p. 23, in Griffiths, 2004: 04). O'Malley et al. (1985) conducted a study on the use of strategies by learners of English as a second language. Language learning strategies according to O'Malley and his colleagues are divided into three significant categories, to wit: metacognitive, cognitive, and socio-affective strategies.

Metacognitive strategies revolve around planning for learning. It is reasoning about the process of learning as it is taking place, monitoring of learner's production or comprehension, and evaluating learning after finishing an activity (Hismanoglu, 2000, p. 03). Metacognitive strategies include selective attention, self-monitoring, and self-evaluation ...etc. Furthermore, cognitive strategies refer mainly to particular learning tasks and require more direct control of the learning material itself (Brown, 2000, p. 124). Among the main cognitive strategies, it is possible to mention: translation, repetition, note-taking, transfer, elaboration...etc. On the other hand, socio-affective strategies are linked to interaction to others for the purpose of learning, for instance cooperation and asking questions for clarification. More details about the classification of language learning strategies by O'Malley et al. are provided in table 2.2 below: (Brown, 2000, p. 125)

Learning Strategy	Description
Metacognitive strategies	
Advance organizers	Making a general but comprehensive preview of the organizing concept or principle in an anticipated learning activity
Directed attention	Deciding in advance to attend in general to a learning task and to ignore irrelevant distracters
Selective attention	Deciding in advance to attend to specific aspects of language input or situational details that will cue the retention of language input
Self-management	Understanding the conditions that help one learn and arranging for the presence of those conditions
Functional planning	Planning for and rehearsing linguistic components necessary to carry out the an upcoming language task
Self-monitoring	Correcting one's speech for accuracy in pronunciation, grammar, vocabulary, or for appropriateness related to the setting or to the people who are present
Delayed production	Consciously deciding to postpone speaking in order to learn initially through listening comprehension
Self-evaluation	Checking the outcomes of one's language learning against an internal measure of completeness and accuracy
Cognitive Strategies	
Repetition	Imitating a language model, including overt practice and silent

	rehearsal
Resourcing	Using target language reference materials
Translation	Using the first language as a base for understanding and/or producing the second language
Grouping	Reordering or reclassifying, and perhaps labelling, the material to be learned based on common attributes
Note taking	Writing down the main idea, important points, outline, or summary of information presented orally or in writing
Deduction	Consciously applying rules to produce or understand the second language
Recombination	Constructing a meaningful sentence or larger language sequence by combining new elements in new way
Imagery	Relating new information to visual concepts in memory via familiar, easily retrievable visualizations, phrases, or locations
Auditory representation	Retention of the sound or a similar sound for a word, phrase or longer language sequence
Keyword	Remembering a new word in the second language by (1) identifying a familiar word in the first language that sounds like or otherwise resembles the new word and (2) generating easily recalled images of some relationship between the new word and the familiar word
Contextualization	Placing a word or phrase in a meaningful language sequence
Elaboration	Relating new information to other concepts in memory
Transfer	Using previously acquired linguistic and/or conceptual knowledge to facilitate a new language learning task
Inferencing	Using available information to guess meanings of new items, predict outcomes, or fill in missing information
Socio-affective Strategies	

Cooperation	Working with one or more peers to obtain feedback, pool information, or model a language activity
Question for clarification	Asking a teacher or other native speaker for repetition, paraphrasing, explanation, and/or examples

Table 2.3.: Classification of learning strategies by O'Malley et al. (1985; in Brown, 2000, p.125)

In point of fact, the model presented by O'Malley et al. has been recognized as being comprehensive and supplies a strong theoretical base for the classification of language learning strategies. O'Malley and Chamot highly stress the importance of metacognitive strategies. They believe that "students without metacognitive approaches are essentially learners without direction or opportunity to plan their learning, monitor their progress, or review their accomplishments and future learning directions" (1990, p. 08, in Hardan, 2013, p. 1716). They also consider the cognitive strategy of repetition as "the most frequently used strategy" (1990, p. 80, in ibid).

However, as it can be noticed in the table above unlike metacognitive and cognitive strategies, socio-affective strategies are less elaborated. Moreover, for some scholars like Brown, the socio-affective strategies suggested by O'Malley et al. along with other strategies are in fact communication strategies. The latter, though closely related to learning strategies, they differ from them in that they "pertain to the employment of verbal or nonverbal mechanisms for the productive communication of information", while learning strategies "deal with the receptive domain of intake, memory, storage, and recall" as maintained by Brown (ibid, p. 127). This controversy would receive further attention by scholars, for example Oxford (1990), in recent research through providing more elaboration of LLS.

B. Oxford's (1990) Classification of Language Learning Strategies:

Oxford also shared Rigney's definition of language learning strategies as "operations employed by the learner to aid the acquisition, storage, retrieval, and use of information" (Oxford, 1990: 08, in Griffiths, 2004, p. 04). This definition makes the theoretical base for Oxford's classification which is often considered as a further development of O'Malley's et al. (1985). In her categorization of LLS, Oxford tried to address the problem of overemphasizing metacognitive and cognitive strategies at the expense of social and affective strategies in previous strategy inventories.

Oxford's classification includes direct and indirect strategies. Direct strategies involve mental process and directly influence the target language, whereas indirect strategies "are those supporting and managing language without directly involving the target language" (1990, p. 14). In other words, direct strategies are directly related to and necessitate the target language, for example: practicing and reviewing; however, indirect strategies like planning and cooperating allow for indirect reinforcement of language learning.

Both direct and indirect strategies represent six types of learning strategies, namely: memory strategies (how students remember language), cognitive strategies (how students think about their learning), compensation strategies (help students to compensate for limited knowledge), metacognitive strategies (how students manage or control their own learning), affective strategies (relating to student's feelings), and social strategies which require learning through interacting with others. Below table 2.3 provides further explanation of Oxford's classification of LLS.

Direct Strategies		
Memory	Creating mental images	Grouping; associating/elaborating; placing a new word into a context
	Applying images and sounds	Using imagery; semantic mapping; using keywords; representing sounds in memory
	Reviewing well	Structured viewing
	Employing action	Using physical response or sensation; using mechanical techniques
Cognitive	Practicing	Repeating; formally practicing with sounds and writing systems; recognizing and using formulas and patterns; recombining; practicing naturalistically
	Receiving and sending messages	Getting the idea quickly; using resources for receiving and sending messages
	Analysing and reasoning	Reasoning deductively; analysing expressions; analysing contrastively across languages; translating; transferring
	Creating structure for input and output	Taking notes; summarizing; highlighting

Compensation	Guessing intelligently	Using linguistic clues; using other clues
	Overcoming limitations in speaking and writing	Switching to the mother tongue; getting help; using mime or gesture; avoiding communication partially or totally; selecting the topic; adjusting or approximating the message; coining words; using circumlocution or synonym
Indirect Strategies		
Metacognitive	Centering your learning	Overview and linking with already known material; paying attention; delaying speech production to focus listening
	Arranging and planning your learning	Finding out about language learning; organizing; setting goals and objectives; identifying the purpose of a language task (purposeful listening / reading /speaking / writing); planning for a language task; seeking practice opportunities
	Evaluating your learning	Self-monitoring; self-evaluating
Affective	Lowering your anxiety	Using progressive relaxation, deep breathing, or meditation; using music; using laughter
	Encouraging yourself	Making positive statements; taking risks wisely; rewarding yourself
	Taking your emotional temperature	Listening to your body; using a checklist; writing a language learning diary; discussing your feelings with someone else
Social	Asking questions	Asking for clarification or verification; asking for correction
	Cooperating with others	Cooperating with others; cooperating with proficient users of the new language
	Empathizing with others	Developing cultural understanding; becoming aware of others' thoughts and feelings

Table 2.4.: Oxford's classification of language learning strategies (adapted from Brown, 2000, p. 133)

As it is clearly observed in the above table, unlike Rubin's and O'Malley's et al. classifications, Oxford's classification of LLS includes a lot of details about strategy categories

and their sub-categories as well. In comparison with Rubin's classification, Oxford's categorization of strategies differs from Rubin's in that, for instance, while Rubin considers clarification/verification and monitoring as direct strategies, for Oxford these are indirect strategies categorized into social and metacognitive strategies, respectively. Moreover, Oxford's model presents compensation strategies as part of direct strategies, whereas in Rubin's classification the same strategies (labelled as production tricks) are found in the category of indirect strategies. Ostensibly, Oxford's classification system is also distinguishable from that of O'Malley's et al. (1985). For example, Oxford's consideration of socio-affective strategies differs from O'Malley's et al. in that when Oxford separates social from affective strategies, O'Malley et al. handle them integrated under one title (socioaffective). Another difference is that besides O'Malley's et al. cognitive strategies which represent learners' thinking about their learning, Oxford elaborates on memory strategies which are mainly linked to how learners remember language.

It is as well noteworthy that the categories which underpin Oxford's taxonomy are possible to overlap. However, this overlap sometimes leads to confusion as whether a compensation strategy (e.g. searching for synonyms when the exact word is not known) can be considered as a learning strategy or a communication strategy (Ellis, 1994; in Griffiths, 2004). Relevant to this, Oxford declares that "there is no complete agreement on exactly what strategies are; how many strategies exist, how they should be defined, demarcated, and categorized; and whether it is –or ever will be- possible to create a real, scientifically validated hierarchy of strategies .... Classification conflicts are inevitable." (p. 17; in ibid, p. 05)

As a matter of fact, attempts at establishing consensus over definitions of language learning strategies and their classification systems is still far from being attainable. Nevertheless, Rigney's (1978) definition along with Oxford's classification is more often than not conceived as a utile theoretical base for better comprehension of language learning strategies. Furthermore, Oxford's taxonomy is regarded as "perhaps the most comprehensive classification of learning strategies to date" (Ellis, 1994, p. 539). It also underlies the Strategy Inventory for Language Learning (SILL). The most widely utilized survey which has been translated into more than 20 languages to unveil the strategies employed by L2 learners (Oxford, 2003).

Eventually, research in the field of LLS has mainly emphasized, (1) identification and classification of strategies; (2) the frequency of their use among learners and the latter's success at using them; (3) the different variables that might affect successful employment of LLS, e.g.

language proficiency level, age, gender, and motivation, among others; and (4) the influence of strategy training on student performance in language learning and use. Furthermore, a noteworthy fact is that despite being controversially defined and somehow differently classified, language learning strategies are more and more attracting the concern of present-day researchers as well as teachers due to their importance in helping L2 learners to increase their ability in learning the target language. Accordingly, developing learning strategies in contemporary EFL classes is gaining momentum since its significance in enhancing learning is undeniable, particularly among ESP learners.

II.3.2. Significance of Developing Language Learning Strategies among ESP Learners:

As it has already been discussed in the first chapter, the fact that no teaching method has proved to be the panacea to the everlasting problems faced by second/foreign language learners has paved the way to growing interest in focusing research on exploring the process of language learning instead of language teaching. Accordingly, scholars shifted their concern from finding out the best teaching methods and techniques to investigating the most efficient strategies that can help students proceed through learning a foreign language. Elaboration on language learning strategies has then become the focal point of language learning research in recent years (Rubin, 1975; O'Malley et al., 1985; O'Malley and Chamot, 1987; Stern, 1975; Oxford, 1990). Consequently, it has become apparent that the development of learning strategies among EFL learners is crucial, especially in the context of EFL for specific purposes.

Prominent researchers in LLS field have often highlighted the significance of developing students' learning strategies. In 1993, O'Malley and Chamot claimed that "individuals who take a more strategic approach learn more rapidly and effectively than individuals who do not" (p. 105, in Hardan, 2013, p. 1716). Additionally, according to Oxford, strategies "make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to new situations" (2003, p. 09). However, following the same author, the usefulness of a strategy is subject to certain conditions like: relevance of the strategy to the L2 task at hand; suitability of strategy to the particular student's learning style preferences to a certain degree; and the employment of the strategy effectively by the student through linking it to other relevant strategies. In this case, a strategy can be said to be positive and efficient for learners. Furthermore, learning strategies, when consciously used by L2 learners not only make learning

faster and more efficient (Nyikos and Oxford, 1993) but even help students to be independent, autonomous, lifelong learners (Allwright, 1990; Little, 1991; in ibid.)

Using language learning strategies by L2 learners appropriately can help them develop their language skills efficiently. In fact, language learners consciously or unconsciously make use of various strategies while processing a new input or doing a task. For example, as maintained by Fedderholdt (1997), developing use of metacognitive, cognitive, and socioaffective strategies help overcome many language problems that would result as well in building up learner independence and autonomy. Moreover, many prominent scholars in the field (Canal and Swain, 1980; Bialystok, 1990; Oxford, 1990; Lessard-Clouston, 1997, Griffiths, 2013) agree on that language learning strategies strongly contribute to the development of students' communicative competence which is generally the ultimate goal of foreign language curricula, particularly within the framework of recent communicative approaches to language teaching. Therefore, LLS as Oxford puts forward "...are especially important for language learning because they are tools for active, self-directed involvement, which is essential for developing communicative competence" (1990, p. 01, in Lessard-Clouston, 1997, p. 03).

Additionally, to show the significance of LLS, many studies have explored the relationship of strategies to successful language learning. Accordingly, recent research reveals that developing students' use of LLS may help them become successful language learners. In fact, early research in this arena has also showed that strategies are usually used by "good language learners" (Naiman, et al., 1978; Rubin, 1975; Stern, 1975, 1982). They even attribute positive learning strategies to successful language learners. In the same vein, various prominent studies have found that more successful learners tend to significantly use more strategies than unsuccessful ones (Green and Oxford, 1995; Griffiths, 2003; Park, 2010). Furthermore, besides Rubin (1975) who considers learning strategies as an efficient tool to enhance successful learning, several investigations have reported the existence of a positive relation between successful learning and the frequency of strategy use (Green and Oxford, 1995; Dreyer and Oxford, 1996; Kyungsim and Leavell, 2006). Moreover, in a study conducted by Griffiths and Cansiz (2015) results show that higher level students deploy many more strategy than lower level students. Another study by Park (2010) also reveals that efficient learners use strategies more appropriately. Similarly, studies have also stated that efficient L2 learners are usually conscious of strategies they employ and why to employ them.

Nevertheless, these findings cannot be always generalized since sometimes even bad language learners utilize the 'good language learning strategies', but they fail to learn the language for one reason or another. In this vein, Skehan posits that "there is always the possibility that the 'good' language learning strategies ... are also used by bad language learners, but other reasons cause them to be unsuccessful" (1989, p. 76, in Lessard-Clouton, 1997, p. 03). Relevant to this, research determinations suggest that unsuccessful language learners often lack awareness about metacognitive strategies that may enable them to monitor and evaluate their language learning process (Vann and Abraham, 1990).

On the other hand, becoming a good language learner requires effective training in the use of LLS. Consciously or unconsciously, students often use learning strategies that reflect their learning style preferences which are not yet stretched to meet the challenges of the learning process. It is the role of the teacher to help these students to build up an awareness of learning strategies and enable them to employ a wider range of suitable strategies (Oxford, 2003, p. 09). As Lessard-Clouston maintains "helping students understand good language learning strategies and training them to develop and use such good language learning strategies can be considered to be the appreciated characteristics of a good language teacher" (1997, p. 03). As such, strategy instruction[16] is the most appropriate way to help students develop learning strategies in terms of awareness and use.

With reference to ESP, though little research has been concerned with the role of LLS in ESP context, most available studies have revealed the importance of developing LLS among ESP learners. Furthermore, Oxford's (1990) Strategy Inventory for Language Learning (SILL) has been widely used by researchers to investigate correlations between LLS and other variables like: gender, language proficiency, frequency of use, among others. For instance, Shah et al. (2013) conducted a study on the patters of LLS as reported by the students according to gender, courses, and undergraduate programs. The findings of the study demonstrated that students from the different degree programs vary in their use of LLS and there is no significant relationship between LLS and gender. However, this was not the case for the Algerian context. In 2018, Bessai used Oxford's LLS inventory to investigate the patterns of language learning strategy use deployed by first and third year EFL students in the Department of English, University of Algiers2. The findings of the study indicate that students from both years use language learning strategies, yet with differences in type and frequency. Metacognitive strategies were highly

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[16] Further insights are found in section 2.4.5.

employed by third year students while first year students reveal a high use of compensation strategies. Findings also show gender differences as strategy use was higher among female participants rather than males in all types and categories of LLS inventory. Concerning the use LLS among Algerian ESP learners, no study is found in this vein according to published literature.

Another study by Pasalic (2013) investigates the potential impact of learning strategies on the progress ESP students can make as well as the impact that language learning strategy has on ESP learning, besides the success that students are able to achieve, particularly in Business English in Croatia. The author concludes that despite the positive correlation between LLS and success in language learning, ESP students in Croatia lack the awareness of the benefits of learning strategies. Consequently, ESP teachers at tertiary level in Croatia will have to offer more student-friendly instructions on the effective use of various learning strategies in ESP classes which would enhance students' proficiency, comprehension, and command of English. In the same vein, Patil and Karekatti (2012) initiated a study to find out LLS used by engineering students of four engineering colleges in Ratnagiri District (India). The primary purpose of their study was to identify the types and degree of use of LLS employed by these engineering students. Results reveal that students reported a high level of use of metacognitive, cognitive, compensatory, and social strategies; whereas insufficient use of memory and effective strategies is also recorded. Moreover, it was observed that these engineering students are totally unaware of the benefits of LLS and how they can be utilized in learning English. From their part, Alqahtani, A. and Alhebaishi, S. (2010) tried to examine the relationship between English proficiency and language learning strategies. Their findings report that (1) the most frequently used strategies were the metacognitive strategies while the affective strategies were the least used ones; and (2) English proficiency was found correlating to a high degree with metacognitive strategies.

Notwithstanding, more prominent studies have been interested in investigating LLS with reference to specific aspects of language learning like retention of vocabulary. For instance, Akbari and Tahririan (2009) examined the vocabulary learning strategies among Iranian medical and paramedical students. They focused on the personal, task-related, and context-linked factors that may influence the students' adoption of various vocabulary strategies. The researchers discovered that motivation for learning and anxiety are two influential factors that have significant effect on learners' vocabulary strategy use. Consequently, they maintain that ESP learners need explicit teaching of both vocabulary and strategies to improve their own learning.

As a matter of fact, and as it has revealed above, many studies have dealt with language learning strategies in relation to various variables that may affect language acquisition, mainly in ESP context. Furthermore, it has also been indicated that the majority, if not all, of the studies have emphasized significance of LLS in ESP setting. That is why, language researchers like Dudley-Evans and Waters (1998) argue for the necessity to aid ESP learners acquire learning strategies that pertain to their own field of study.

Eventually, the significance of developing language learning strategies among ESP learners is undeniable. It helps them develop their learning strategies, language proficiency, and academic achievement, as well as it enables them to become efficient language learners. Nevertheless, since the consulted studies report that the majority of ESP students are unaware of language learning strategies –let alone their significance and use- it is highly required to help those students raise their awareness of these learning strategies in general and even with reference to particular language skills, for example critical reading as the present study suggests. The forthcoming section provides more insights in this vein.

II.3.3. Critical Reading Strategies: Identification, Classification and Measurements

II.3.3.1. Identification and Classification of Critical Reading Strategies:

After elaborating on critical reading from different aspects especially in terms of its conceptualization, now we move on to critical reading strategies. It is often assumed that promoting critical reading as well as higher order thinking skills among foreign language learners requires the development of critical reading strategies, mainly in regards to awareness and use. As a matter of fact, critical reading strategies have just recently gained such a wide range of interest among educators and researchers whose main efforts have been primarily devoted to identify this concept and classify its components. Ostensibly, the various definitions attributed to CRS express fundamentally the same perspective.

Concomitantly, studies in foreign language reading research have often reveal the importance of the different strategies used by learners to help them proceed throughout the process of learning, acquiring, and storing information as well as retrieval. Perhaps, it is noteworthy that strategies are usually differentiated from skills. This distinction is maintained by many researchers, like Paris, Wasik and Turner who posit that:

"Skills refer to information-processing techniques that are automatic, whether at the level of recognising grapheme-phoneme correspondence or summarizing a story. Skills are applied to a text unconsciously for many reasons including expertise, repeated practice, compliance with directions, luck, and naive use. In contrast, strategies are actions more deliberately selected to achieve particular goals. Strategies are more efficient and developmentally advanced when they become generated and applied automatically as skills. Thus, strategies are skills under consideration" (in Carrel, 1998, p. 04)

In fact, this approach is supported by Carrel as well. For her the term strategies denote "the actions that readers actively select and control to achieve desired goals or objectives" (ibid). Here it can be understood that the term strategies may be used to describe "skills" in the beginning phase of their developmental process. In other words, strategies confine to any action deployed deliberately by the reader while interacting with a text to facilitate comprehension. When the actions transfer into unconscious automatic behaviours, through continuous practice of course, they become skills. The present study opts for the term strategies and not skills since our participants are not yet skilful readers (otherwise this study would not be conducted), rather they are intended to become so through enhancing the practice of critical reading strategies.

Pedagogically speaking, it is indispensible for ESP students to be able to read scientific texts critically, as critical reading not only fosters those students' language proficiency but even enhances their content knowledge and higher order thinking skills. However for this to be achievable, students have to reveal high ability of using effective strategies and techniques that may help them fully understand a text and critically analyse it. Therefore, students should be able to comprehend their own reading processes and the different challenges that may encounter them, especially when dealing with difficult texts. Meanwhile, they have to be aware of the strategies available to face these challenges, which will develop them as effective critical readers. For example, previewing a text and predicting its main topic and author's purpose of writing, before reading it, will help the reader to know its general idea in a very short time as well as evaluating its efficiency to decide whether it is worth reading or not. Another example, the highlighting which is often thought to be and is widely used as a good reading technique, it is in fact ineffective. Annotating and marking the text, instead, through writing in its margins is more beneficial than highlighting. Pausing and pondering on one's reading process to check and control its effective ongoing is also a feature of critical readers.

In point of fact, various comprehension reading strategies have been identified and classified by many researchers while little has been done for critical reading strategies. Some other researchers consider general reading strategies as the same that can develop critical reading and others assume that critical reading can be fostered through enhancing metacognitive reading strategies (Parson, 1985). Consequently, it has to be noticed that critical reading strategies are different yet complementary to comprehension reading and metacognitive strategies. As such the promotion of critical reading strategies involves the development of reading strategies, metacognitive strategies as well as other strategies pertinent to critical reading practice. Therefore, it is important to look first at general reading strategies and metacognition before indulging into critical reading strategies.

a. General Reading Strategies

As it is usually argued readers' comprehension of the reading material is subject to their effective use of reading strategies. Strategy use distinguishes between effective and ineffective readers (Anderson, 2002; Cohen, 2003). According to Afflerbach, Pearson, and Paris (2008, p. 368), reading strategies are defined as "deliberate, goal directed attempts ... to control and modify the reader's efforts to decode text, understand words, and construct meaning of text". In the same vein, Barnett (1988) views reading strategies as the mental operations underpinning readers' effective approach to a text and how they make sense of what they are reading. Furthermore, due to their significant role in productive reading comprehension, reading strategies have been widely investigated; and based on various studies in second language reading, researchers have classified reading strategies with reference to the fundamental phases of the reading activity: pre-reading, while-reading, and post-reading. Consequently, reading strategies can be as simple as guessing the meaning of difficult terms from context to summarizing or linking what has been read to the reader's already acquired information.

Relevant to this, Paris et al. (1996) identify three categories that can enhance one's comprehension of the reading material. They refer to these strategies as: Pre-reading strategies, While –reading strategies, and Post-reading strategies. More insights are given in this table:

Pre-reading strategies	While-reading strategies	Post-reading strategies
1. Establishing a good physical environment	1. Checking comprehension throughout the reading activity	1. Appreciation of text and writer

2. Setting reading purpose	2. Identifying the main idea	2.Revisit pre-reading
3. Accessing prior knowledge	3. Making inferences	3.Review notes, glosses, text markings
4. Asking questions based on the title	4.Recognizing patterns in the text structure	4.Reflect on text understanding
5. Semantic mapping	5.Looking for discourse markers	5. Consolidate and integrate information
6. Skimming for general idea	6.Monitoring vocabulary	6. Review of information
7. Preview the text	7.Predicting the main idea of each paragraph	7. Elaborate and evaluate
8. Reviewing instructions	8.Glossing	8. Determining which information is needed
9. Identifying text structure	9.Comparing what is read with what is known	9. Apply new information to the task at hand
10. Determining what is known about the topic	10.Evaluating value of what is being learned	10. Relate the text to own experience
11. Predicting what might be read	11.rereading text or skipping ahead	11. Critique the text

Table 2.5. : Comprehension strategies (Paris et al., 1996, in Abd Kadir, 2014, p. 213)

On the other hand, as cited by Munsakorn (2012, p. 822), Adams and Patterson construe reading strategies as the mental process people make use of to increase their reading comprehension. Moreover, they categorize reading strategies into ten types as follows:

1. Scanning refers to reading very quickly but carefully to find specific information.

2. Skimming refers to moving one's eyes rapidly through the material to get its general idea.

3. Schema implies connecting new information to previous knowledge then interpreting it meaningfully.

4. Identifying main ideas and supporting details refers to the use of keywords that lead to topic sentences to obtain the main idea as well as identifying the crucial details (fact, reason, comparison, example or statistics) which develop the main idea.

5. Using grammatical clues involves the use of for example, part of speech, sentence pattern, punctuation, tense, etc to unlock word and sentence meaning.

6. Using word parts (like prefix, suffix, and root) to determine the meaning of words.

7. Using context clues refers to the use of features within the sentence or paragraph that can help the reader decipher the meaning of unfamiliar words: pronoun reference, restatement, transitional marker, relative pronoun, synonym, and antonym.

8. Making inferences consists in using context clues and background knowledge to gather information and draw the proper meaning that is not overtly stated by the author.

9. SQ3R, which stands for Survey, Question, Read, Recite, and Review, implies that one should pick out only the significant points and fixes them in his or her memory, resulting in faster reading.

10. Summary which is stating briefly in one's own words the main and supporting ideas in a reading selection. The basic guidelines for a summary are threefold: it has to be brief, complete, and objective.

Meanwhile, based on findings in the use of cognitive learning strategies as being fundamental to successful language learning (O'Malley & Chamot, 1987; 1990; Haris & Pressley, 1991; Oxford, 1990), research has also emphasized the significant role of cognitive reading strategies in boosting comprehension. Types of cognitive reading strategies as suggested by Oxford and maintained by O'Malley and Chamot include: resourcing, repetition, grouping, deduction, imagery, getting the idea quickly, elaboration, inferencing, note-taking, and summarizing (cited in Ratna, 2014, Pp. 03-04).

1. Resourcing is the use of target language reference materials like dictionaries to better comprehend what is read.

2. Repetition involves reading a passage more than once for complete understanding.

3. Grouping refers to classifying or reclassifying what is read into meaningful groups to get rid of irrelevant elements.

4. Deduction in reading can be represented by the practice of reading the first line of each paragraph to get the main idea of the whole text.

5. Imagery revolves around the use of visual images (mental or actual) to understand and remember what has been read.

6. Getting the idea quickly involves skimming and scanning strategies.

7. Elaboration is relating what han been read to prior knowledge

8. Inferencing refers to the utilization of available information to guess the meaning of new items as using the title to predict the content of the text.

9. Note-taking means writing down key words and concepts in an abbreviated way while reading for the purpose of organizing or remembering information.

10. Summarizing refers to writing a summary of newly gained information.

In the same vein, from his part Anderson (2003), as cited by Ling (2011:15), proposes ten cognitive strategies that pertain to reading comprehension:

1. Predicting the upcoming content of text;

2. Relying in grammar to help understand unfamiliar constructions and understanding the main idea to help grasp the entire reading;

3. Expanding vocabulary and grammar to augment reading pace;

4. Using prior knowledge about English to guess the meaning of unfamiliar words;

5. Analysing theme, style and connections to improve comprehension;

6. Distinguishing between opinions and facts;

7. Breaking down larger phrases into smaller parts to help understand difficult passages;

8. Linking L1 knowledge with words in English;

9. Creating a map or drawing of related ideas to understand the relationship between words and ideas;

10. Writing a short summary of what you read to help get the main ideas.

These are considered as the most important general reading strategies that can enhance the reader's comprehension of the reading material. Nevertheless, second language reading research has also argued that responding cognitively to the reading activity is not enough unless this is supported by the reader's awareness of metacognitive reading strategies. The latter would permit to the reader to have more control over their reading process through monitoring and self-regulation.

b. *Metacognition and Reading Comprehension:*

As it is often assumed metacognition involves thinking about learning. It is "an awareness of how one thinks" (Corner, P. 2003: 106). Metacognition is also construed as "the conscious awareness of cognitive processes" (Bernhardt, 1991, p. 52), "cognition of cognition" (Carrell, Pharis, and Liberto, 1989, p. 647), as well as "knowledge about learning" (Wenden, 1998, p. 516). In the same vein, Flavell, who is credited as the pioneer of the term, views metacognition as the "knowledge that takes as its object or regulates any aspect of any cognitive endeavour" (1979, p. 08). Flavell's definition implies that metacognition revolves around the thought

processes the learner utilizes to learn as well as to the self-regulation of cognition. Furthermore, according to Williams and Burden (1997) metacognitive strategies include "ability to manage and regulate consciously the use of appropriate learning strategies for different situations. They involve an awareness of one's mental processes and an ability to reflect on how one learns, in other words, knowing about one's knowing" (p. 148).

As far as reading comprehension is concerned, metacognition pertains to pondering on or thinking about what one is reading (Hacker, 1996). Put another way, it is the reader's reflection on his own way of interacting with a given text. Relevant to this, metacognitive reading strategies entail monitoring comprehension and taking measures to increase it through identifying a purpose for reading, planning how the text will be read, self-monitoring for errors in reading comprehension, and self-evaluating how well the objectives are well fulfilled, otherwise corrective measures have to be taken if comprehension is not being achieved (Dhieb-Henia, 2006; Gaith, 2018). Following this tendency, it is quite noticeable that metacognition has a significant role in the process of reading comprehension. For this Janzen (2001: 372) emphasises that "increased self-awareness of one's process of reading is needed for students to make more efficient use of wider range of strategic behaviours" (in Anderson, 2004: 16).

From his part, Phakiti (2006) provides a list of cognitive, metacognitive and affective reading strategies. According to the same author, cognitive strategies include *comprehending strategies*[17] for understanding the text, *memory strategies* for transforming information into a form that can be stored in memory for later use, and *retrieval strategies* for remembering information either from current or long-term memory. Next, metacognitive strategies are composed of *planning* for actions and goal attainment, *monitoring* for checking ongoing understanding or performance, evaluating for evaluation of past and current actions or performance. Lastly, affective reading strategies "are composed of *motivation control* (how to persuade oneself to read successfully), *volition-control* (how to invest efforts or willingness to complete reading or learn how to read) and *anxiety coping* (how to deal with anxiety arising from reading) strategies" (2006, p. 48). Relevant to this, Phakiti's taxonomy of reading strategies revolves around what he perceives as plausible individual cognitive, metacognitive and affective processes involved in L2 reading as shown next:

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[17] Author's italics

Cognitive strategies	
Comprehending strategies	- Identifying main ideas, author's attitudes/tones - Summarizing main information - Analysing author's purposes - Predicting - Translating message into native language - Guessing meaning of unknown words using context clues - Using a dictionary - Clarify indirect meaning - Distinguishing facts from opinions - Making inferences based on the available information - Connecting important ideas in text
Memory strategies	- Making use of available typographical features such as bold face, italics, pictures, tables or figures in text - Rereading - Note taking underlying main ideas or highlighting important information - Recognizing previous read words or information - Paraphrasing or simplifying information to remember
Retrieval strategies	- Using prior knowledge or experience relevant to the topic - Relating new information in text with previously read text - Using grammar rules to understand meaning - Applying knowledge of word stems, prefixes or suffixes to guess meaning of unknown words - Recalling reading purposes/task obligation
Metacognitive strategies	
Planning strategies	- Setting reading purposes or goals - Keeping reading purposes or goals in mind - Figuring out what needs to be accomplished - Identifying reading task expectations - Planning steps or actions before reading - Overviewing texts or reading tasks before reading
Monitoring strategies	- Checking if comprehension occurs - Checking comprehension when coming across new information - Controlling concentration or attention during reading - Noticing when confusion occurs - Double-checking comprehension when encountering ambiguous

	information
Evaluating strategies	• Assessing levels of text difficulty and reading demands • Engaging self-questioning while reading • Evaluating accuracy in reading such as via task completion performance
Affective strategies	
Motivation-control	• Investing extra effort to read text • Telling oneself not to give up reading despite reading difficulty or lack of motivation • Telling oneself that hard work is worthwhile and compensates for the lack of knowledge or ability required by the reading
Anxiety coping	• Telling oneself to relax when feeling tense from reading pressure or difficulty • Convincing oneself that anxiety is only temporary • Telling oneself that stress is normal for everyone • Telling oneself that mistakes are the means to improve learning • Letting go of worries about past reading performance and trying one's best with the current reading • Stopping reading for a moment when feeling stressed or confused.

Table 2.5.: Phakiti's taxonomy of cognitive, metacognitive, and affective reading strategies

(2006, p. 48)

Based on Phakiti's classification of reading strategies, Shamsudin (2009) elaborates on cognitive, metacognitive and affective strategies that pertain to science text reading with reference to the three phases of the reading process, namely: pre-reading, while-reading, and post-reading phase. Shamsudin's classification is justified in terms of the argument that science text reading has to be construed as "a meaning-making process" rather than "a meaning-taking process", which involves commitment and time planning. The table below represents Shamsudin's classification of science text reading strategies that reflect the Malysian context.

Reading phases	Cognitive strategies	Metacognitive strategies	Affective strategies
Pre-reading phase	1.actively participate verbally and try to relate the topic and integrate keywords and concepts	1.find word meaning 2.access to prior knowledge	1.positive self-talk 2.acknowledge importance of text

	2.preview be predicting text 3.paying attention to text 4.skimming		
While-reading phase	1.rarely skip word 2.read aloud 3.refer to other sources 4.rewrite specific facts 5.highlight words 6.translate 7.create own illustration 8.agree with text 9.paraphrase	1.summarize to review 2.summarize by listing back 3.questionning 4.fix-up 5.guess meaning 6.find word meaning	1.emotionally influenced by science text presentation 2.confortable when no difficulties 3.positive self-talk
Post-reading phase	1.refer to other sources 2.paraphrase in Malay language 3.retell in Malay language	1.summarize to review 2.give opinion 3.discuss	1.emotionally influenced by science information

Table2.6: Shamsudin's classification of science text reading strategies (2009, p...)

Furthermore, a recent well known categorization of reading strategies by Sheorey and Mokhtari (2001) includes global strategies which readers deploy to predict text, content, set a purpose for reading, and self-regulate the reading process. These are also referred to as general strategies (Block, 1992). Then again, problem solving and support reading strategies – also known as local strategies (ibid.) – are used by readers to comprehend particular linguistic units (Sheorey and Mokhtari, 2001). These sub-categories of reading strategies make fundamentally the basis of metacognitive reading strategies (more insights in the next section). Additionally, most research findings assume that awareness and use of metacognitive reading strategies may help readers successfully deal with the problems they meet while reading and finally attain comprehension.

In fact, all the aforementioned classifications of reading strategies pertain mainly to reading comprehension – reading between the lines. Yet, when considering reading beyond the lines or critical reading one should reveal an awareness of critical reading strategies.

c. *Critical Reading Strategies:*

Like language learning strategies in general and reading strategies in particular, critical reading strategies can also be construed as the different acts and behaviours that readers make use of when dealing with the reading material in order not only to grasp its general idea or meaning but even to evaluate, judge and criticize this main idea, among other aspects of the reading material.

The earliest list of critical reading skills was perhaps the one suggested by Williams (1959). As reviewed by Duquette (1973), Williams conducted a study on eighty basal readers from ten publishing companies and determined one hundred eighty-six critical reading skills. This number was later condensed into thirty-three as follows:

1. Anticipating outcomes	18. Generalizing
2. Appreciating humour, plot	19. Identifying elements of style
3. Classifying ideas	20. Identifying and evaluating character traits
4. Comparing and contrasting	21. Interpreting figurative and idiomatic language
5. Critical thinking	22. Identifying ideas implied, not stated
6. Distinguishing between fact and fancy	23. Judging author's statements on background of author
7. Distinguishing between fact and opinion	24. Judging reasonableness and relevance
8. Drawing conclusions	25. Making inferences
9. Establishing sequence	26. Making judgements
10. Establishing cause and effect	27. Reviewing relationships
11. Evaluating author's attitude	28. Predicting outcomes
12. Evaluating and reacting to ideas in light of the author's purpose	29. Reacting to the mood or tone of a selection
13. Evaluating and solving problems	30. Recognizing emotional reactions and motives
14. Evaluating summaries	31. Recognizing story problems and plot structure
15. Finding information to prove or disprove a statement	32. Relating story experiences to personal experiences
16. Forming an opinion	33. Research
17. Forming sensory impressions	

It seems that even this list can be further condensed into less than thirty three skills as many elements are redundant. For example, item 1 "anticipating outcomes" is repeated in item 28

"predicting outcomes". There is also the possibility of grouping some items into categories. For instance, item 23 and 24 can be included within item 26 "making judgements". Item 22 "interpreting ideas implied, not stated" may imply item 25 "making inferences". These are only some examples. Furthermore, it is clear that Williams did not list her critical reading skills according to specific order or preconceived classification. To illustrate, the skill "drawing conclusions" which gives the impression to appear by the end, it is presented as item 8. Nevertheless, it is worth noting also that the list of critical reading skills highlighted by Williams did not include "questioning" which is usually approved as the pillar of critical reading practice.

Actually, it is often presumed that questioning is the fundamental technique that enables the development of critical reading. Consequently, many authors suggest various critical questions which can be posed along the process of reading critically. These critical questions are assumed to be substantial to promote a critical perspective of the reading material as they may help the reader to attain better comprehension of the different constituent parts (linguistic, social, and cultural) of the text. For example, Wallace (2003, p. 115) makes a list of what she calls "orientating questions" that might guide the critical reading course. These questions include:

- Why has the text been written?
- To whom is the text addressed?
- What is the topic?
- How is the topic written about?
- What other ways of writing about the topic are there?

On the other hand, Molden (2007) suggests a more comprehensive listing of critical questions which are supposed to be efficacious for students analysing texts in critical reading classes. Molden's critical questions are as follows:

- What is this text about? How do we know?
- Who would be most likely to read and/or view this text and why?
- Why are we reading and/or viewing this text?
- What does the composer of the text want us to know?
- What are the structures and features of the text?
- What sort of genre does the text belong to?
- What do the images suggest?
- What do the words suggest?
- What kind of language is used in the text?

- How are children, teenagers or young adults constructed in this text?

- How are adults constructed in this text?

- Why has the composer of the text represented the characters in a particular way?

- Are there 'gaps' and 'silences' in the text?

- Who is missing from the text?

- What has been left out of the text?

- What questions about itself does the text not raise?

- In whose interest is the text?

- Is the text fair?

- What knowledge does the reader/viewer need to bring to this text in order to understand it?

- Which positions, voices and interests are at play in the text?

- How is the reader or viewer positioned in relation to the composer of the text?

- How does the text depict age, gender, and/or cultural groups?

- How does the text construct a version of reality?

- Whose views are excluded or privileged in the text?

- Who is allowed to speak? Who is quoted?

- Why is the text written the way it is?

- Whose view of the world is the text presenting?

- What kind of social realities does the text portray?

- What is real in the text?

- How would the text be different if it were told in another time, place, or culture?

- What kind of person, and with what interests and values, composed the text?

- What view of the world and values does the composer of the text assume that the reader/viewer holds? How do we know?

- What different interpretations of the text are possible?

- How do contextual factors influence how the text is interpreted?

- How does the text mean?

- How else could the text have been written?

- How does the text rely on intertextuality to create its meaning?

Ostensibly, Molden's list of critical questions fits mainly the context of social sciences rather than the scientific domain which is the interest of the present study. Relevant to this, research suggests that strategies that pertain to critical reading may differ according to domain or discipline, text-type and especially the purpose of reading. As cited by Dhieb-Henia, Bazerman

(1985) maintains that the various strategies adopted by scientists reading in their fields are tightly linked to the scientists' own agendas; that is their purpose for reading. As such, different purposes entail distinct approaches to reading; for instance, skimming for getting the general idea and scanning for finding specific information.

On the other hand, Kirszner & Mandell (2000, p. 485), as cited by Vu (2015, p. 17), list 15 critical reading questions which they presume to be relevant to reading any text:

- What is the writer saying?
- What do you the writer is suggesting or implying? What makes you think so?
- What is the writer's purpose?
- What audience is the writer addressing?
- Is the writer responding to another writer's ideas?
- What is the writer's min point?
- How does the writer support his or her points?
- Does the writer use facts, opinions or a combination of the two?
- Does the writer include enough supporting details and examples?
- What pattern of development does the writer use to arrange his or her ideas? Is this pattern the best choice?
- Does the writer seem well informed? Reasonable? Fair?
- Do you understand the writer's ideas?
- Do you agree with the points the writer is making?
- How are the ideas presented in this section like/unlike those presented in other sections you have read?

Compared to Molden's list, Kirszner's and Mandell's list of critical questions seems more reasonable and less redundant. Molden's list is overloaded with too much details that would make the critical reader lost in the reading material and might deviate his purpose of reading through indulging into tiny aspects that would not add value to the progress of the critical reading process. However, Kirszner's and Mandell's list bears apparently more logic to represent critical reading questions. Yet, in all cases, it is clear that posing and answering questions about the text is the most significant strategy of critical reading. Indeed, these critical questions have recently become the focal point of many worldwide University programs.

Furthermore, based on these critical reading questions, various substantial strategies of reading critically have been designed with the purpose of promoting students' critical reading

abilities. To illustrate, strategies like Previewing, Contextualising, Annotating, Outlining, Analysing opposition, Summarizing, Paraphrasing, Synthesizing, Questioning, and Reflecting are the most relevant in critical reading (Axelrod and Cooper, 2000).

Moreover, annotating and contextualizing are the basic critical reading strategies. The former involves marking the text through circling or underlining keywords and writing comments or questions in the margins; whereas the latter refers to putting the text within its cultural or historical context. What is more, the critical reader is also expected to be able analyse and interrogate a text (Tovani, 2000). Accordingly, Tovani (2000) considers the following strategies fundamental to proceed throughout the act of reading critically: determine a purpose for reading (before starting reading), preview the text before reading, pay attention to print features and text structures, mark the text while reading, make connections between the text and reader personal experience and knowledge, monitor own comprehension of the text, summarize the key points when reading is finished (in Nasrollahi, et. al., 2015, p. 10).

With reference to the aforementioned approaches to critical reading strategies, which overlap in most cases, Nasrollahi, et al. (2015) have sorted a list of ten critical reading strategies as shown in the table below:

Critical Reading Strategies	A Brief Summary of the Strategies
Annotating	Reading reactions to and questions about a text directly on the page
Previewing	Getting an overview of text structure, text cues, pictures, and personal experiences prior to reading a text.
Scanning and skimming	Finding out the key features of the reading and reading only to get the gist f the text.
Facts Vs Opinions	Facts can be proved, undisputed, have concrete evidence, and opinion refers to a belief, a value, can be argued.
Drawing conclusions	Looking for clues in the text, thinking about what those clues trigger in prior knowledge, and a prediction.
Monitoring	Monitoring for understanding by checking to see if the text makes sense.
Summarizing	Briefly present the main ideas of the text. Write a paragraph or more that presents the main ideas in your own words.
Synthesizing	Combine ideas and information selected from different texts. Look for patterns among your sources, possibly supporting or refuting your ideas or

	those of the sources.
Questioning	Write questions while you read a text for the first time, you will understand the material better and remember it longer if you write a question for every paragraph or brief section.

Table 2.7.: Critical reading strategies (Nasrollah, et al., 2015, Pp. 10-11)

As a matter of fact, the above strategies are of an essence in order to develop critical reading among students, especially in higher education context which would enable them to cope with the challenges of their academic documents.

On the other hand, in a recent paper, Larking (2017) tries to highlight the most important critical reading strategies for advanced EFL tertiary courses. In particular, the paper suggests critical reading strategies for authentic non-fiction passages that can pose challenges to learners mainly in terms of complexity and quality. According to Larking, Block's (1986) division of strategies into extensive (understanding an author's idea) and reflexive (reacting to those ideas personally) is prominent in considering critical reading strategies. In that, as maintained by Larking "both extensive and reflexive modes are crucial for readers to be able to understand key concepts in a text, reflect on their own individual interpretation, and decide how to use a text" (2017, p. 56). Furthermore, based on the latest findings in critical reading research, Larking has drawn a clear distinction between critical and comprehension-based reading strategies as shown in the table below:

Critical reading strategies	**Comprehension-based reading strategies**
1. Distinguish main idea and supporting ideas 2. Evaluate the credibility of the claims 3. Make relevant inferences about the text 4. Make judgements about how the text is argued 5. Question the author's assumptions 6. Decide how to use the text for your own study 7. Identify rhetorical devices 8. Identify power relations 9. Evaluate the quality of the text 10. Distinguish between fact and opinion	1. Preview a text 2. Scan a text for specific information 3. Recognize topics in the text 4. Locate topic sentences 5. Guessing the meaning of unknown words from the context 6. Skim a text for the overall idea 7. Paraphrase parts of a text in your own words 8. Read faster by reading phrases rather than simple words 9. Reread a text for deeper understanding 10. Understanding the relationship of ideas by recognizing the structure of a text.

Table 2.8.: Critical and comprehension-based reading strategies (Larking, 2017, p. 60)

Larking's research is perhaps the only one that draws clear distinction between critical reading and general reading strategies. Moreover, it is the most pertinent study that relies on critical reading strategies rather than on metacognitive reading strategies to enhance students' critical reading development. Therefore, Larking's contribution is found essential as it is tightly linked to the interest of the present research.

Concomitantly, besides the previous individual contributions many universities have encouraged the creation of various programs whose main purpose is the promotion of students' critical reading. For example, the University of California suggests a set of strategies that pertain to critical readers of scientific papers. These strategies include:

- Identify the paper's major conclusions from the title and Abstract and keep its theme(s) in mind while reading the entire paper.
- Look up unfamiliar words as you encounter them. Re-write them in your own words if necessary, and use that definition when you encounter them in the paper.
- Learn from heading within the Introduction, Methods, Results and Conclusion. These may be summations of major themes of the paper or signify topic shifts.
- Tolerate confusion or ambiguity during your first reading. Try not to expect the complexities of the paper to be clarifies immediately. Your confusion can generate excellent questions that may be answered during your second read, or if not, provide material for discussion or further investigation.
- Do not be put off by complicated Methods. In most cases you do not have to understand all details of the paper's experiments or analyses to make a sufficient synopsis of its main conclusions.
- Summarize. As you reach the end of a section of interest, ask yourself if you could explain it to someone. If yes, great! If no, give it another read.
- Ask yourself questions throughout the paper. This is the 'critical' component of critical reading. Is evidence well-supported? Presented clearly? What are the study's broader implications?
- Read the paper a second or third time, highlighting key points. Check the points with your summaries and the author's abstract. Does your interpretation of the paper match theirs?

The strategies suggested by the University of California are supposed to help the critical reader to make the process of reading critically easier, especially to overcome the challenge of understanding main ideas despite new vocabulary and sometimes difficult subject matter.

In the same vein, and in addition to all the critical strategies discussed previously, Salisbury University goes further to indicate two other salient strategies for achieving critical reading, to wit: evaluation, as well as comparing and contrasting.

Evaluation of the reading material implies how the writer's evidence depicts the topic discussed (Bisset, 2014). Contrary to general reading where readers passively accept the information presented to them in the text, in critical reading, readers do not accept information passively; rather they judge and evaluate the writer's arguments and evidence of the text (Salisbury University, 2009). Consequently, critical readers should not accept anything on face value but they should be aware that any argument must be carefully evaluated. Moreover, evaluation according to Kurland (1998) presumes the reader's thorough analysis of the choices or decisions the writer made concerning the presentation of content, language, and structure of the text, as well as the impact of these choices on text meaning. The logic of the writer's argument whether a claim or a support also has to be evaluated. According to Salisbury University, a claim asserts a conclusion or what the writer wants the reader to accept: an idea, an opinion, a judgement etc.; a support refers to reasons (shared beliefs, assumptions, and values) and evidence (facts, examples, statistics, and authorities) that give readers the basis for accepting the conclusion. As mentioned by Suacillo, et al. (2016) "in testing the logic of the author's argument, the reader must evaluate the arguments in terms of appropriateness, believability, and consistency throughout the entire course of the reading" (p. 613). Thus, an argument can be said to be acceptable when the support is appropriate to the claim and the statements are coherent with one another.

Then again, comparing and contrasting strategy principally relates to exploring likenesses and differences between texts to comprehend them better since most of the readings deal with the same issues or problems but in different ways (Salisbury University, 2009). Comparing and contrasting is done through analysing similarities and differences of the text at hand with previously read texts. As posited by Silver (2015), comparing and contrasting strategy has five aims which are as follows:

1. Strengthening memories by focusing on analysing pairs of ideas, thus strengthens the reader's ability to remember key concepts.
2. Developing high order thinking skills.
3. Increasing comprehension by highlighting the significant details, making abstract ideas concrete, and reduction of confusion between related concepts.

4. Enhancing writing in content areas through a simple structure that organizes information and develops ideas with greater clarity and accuracy.

5. Developing habits of mind.

Similarly, Allen (2004) depicts the strategy of comparing and contrasting as being useful in elucidating concepts and memorizing information as it requires the reader to minutely examine the text in order to find out the similarities and differences.

Eventually, and according to the reviewed literature, it can be assumed that there exist various classifications of critical reading strategies, yet most, if not all, of them overlap in more than one way. It is also clear that similar to general reading strategies, critical reading strategies involve previewing, analysing, synthesizing, and summarizing to understand to what is between the lines; however, unlike general reading strategies, critical reading goes beyond the lines which necessitates critical reading strategies to be based also on evaluation, and comparing and contrasting. In such a way, application of critical reading strategies would not only enhance students' reading comprehension but even empower them in critical reading abilities such as evaluation and judgement. Therefore, it is noteworthy that as critical reading has become the salient attribute of the 21st century higher education, many universities all over the world are encouraging training their students to be aware of critical reading strategies and their use, especially in EFL context, and ESP is no exception. However, any training in reading critically should be established on a reliable measurement of critical reading strategies use among the students before and after the training to ensure students' critical reading development. Research suggests distinct tools that can be deployed to measure students' use of critical reading strategies quantitatively and/or qualitatively as it is explained next.

II.3.3.2. Measurements of Critical Reading Strategies:

Measurement or assessment of foreign language reading comprehension is often perceived as collecting data about students' reading abilities with the purpose using that data for designing and implementing better reading classroom (Gersten, 1999). As cited by Marin (2009), according to Cross and Paris (1987), implementation of reading comprehension assessment should be focused on three specific purposes, to wit: (1) sorting which is employed to guess a learner's academic achievement or to indicate a mastery of an instructional program; (2) diagnosing which is intended to collect data from learners' strategies and processes so that the teacher can make decisions about the instruction process; and (3) evaluating which implies determining the influence of a program on a specific community. Relevant to this, reading comprehension

assessment is certainly significant not only for learners but also for teachers as it informs teaching which would entail supply of necessary changes to enhance the reading program. For this, Barbe (1958) believes that the importance of measuring reading comprehension underpins two definite reasons: (1) to determine whether a student understands what is read, and (2) to know what to teach so that comprehension may be improved" (p. 343).

On the other hand, both qualitative and quantitative measurement tools have been used by reading researchers to assess students' reading strategies from different perspectives. According to Chamot (2007), as being mental processes, strategies use cannot be observed; hence difficult to be measured. Consequently, self-reporting verbalization is highly relied on by many researchers in identifying learners' strategy use. Yet, as posited by Afflerbach (2000), despite their veridicality and imperfection, self-reported data still provide useful information about internal cognitive processing. Similarly, Chamot (2007) considers self-report as perhaps the single best way to explore learners' mental processing. Nevertheless, there exist a wide range of measurement techniques that researchers can make use of but cautiously as each technique has its own advantages and disadvantages. Relevant to this, Robson (1993) suggests that the main purpose of the study must always be taken into consideration whatever method a researcher adopts.

It is noteworthy that reading strategies are mainly based on language learning strategies measurement methodologies. Therefore, exploring measurements of critical reading strategies would certainly imply consideration of measurement of language learning strategies in general and the reading skill in particular. Additionally, reading researchers may adopt qualitative measurements like think-aloud protocols and diary studies or quantitative measurements like inventories and traditional tests. Below more details are provided about both types of measurement.

II.3.3.2.1. Qualitative Measurements:

Qualitative measurement of reading is principally based on using informal ways of assessment to investigate the quality of students' responses during the reading process. These measurements include observation, interviews, as well as think-aloud protocols and reflective journals which are the most widely used measurement tools in assessing reading processes, reading strategies,...etc. (Flippo, 2003, in Tsai and Chang, 2010, p. 29). Think-aloud protocols and reflective journals are considered hereinafter.

- ***Think-Aloud Protocols***

Think-aloud protocol is a qualitative research tool which has been extensively used in cognitive psychology to verbalize subjects' mental process or cognitive events. According to Simons (1971), in a think-aloud procedure "readers are asked to describe orally the way they go about answering comprehension questions" (p. 352). In other words, think-aloud protocols require participants to verbally externalize their thoughts or what they are thinking about during the performance of a task. As mentioned by Yoshida "the participants are usually instructed to keep thinking aloud, acting as if they are alone in the room speaking to themselves" (2008: 199). It is also referred to as verbal protocol analysis which revolves around the possibility of instructing subjects "to verbalize their thoughts in a manner that does not change the sequence of thoughts and could therefore be accepted as valid data on thinking" (Tsai and Chang, 2010, p. 30).

Furthermore, there are two categories of think-aloud: retrospective and concurrent. In the former, participants are supposed to remember, after a task performance, what they were thinking about during the process of completing that task (Yoshida, 2008, p. 199). In the latter, however, respondents are required to express loudly what they are thinking during the process of doing the task (ibid, p. 200). Though this looks like introspection, concurrent think aloud is different in that "there is no time lapse in the protocol method between the reading reported on and the reporting, the data derives from actual reading not from words or from questions relating to the reading. Furthermore, the subject is not asked to theorize about his process." (Olshavsky, 1976, p. 661) From their part, Ericson and Simon (1993) make a distinction between reports that involve participants to verbalize their thoughts per se (non-metalinguistic verbalization) and those which involve participants to verbalized additional data like explanations and justifications (metalinguistic verbalization) (ibid).

Moreover, researchers have argued that think aloud protocol as a methodology is beneficial in reading research as it yields significant processes which occur during the reading activity (Olshavsky, 1976; Pressley and Afflerbach, 1995; Wade, 1990; Magliano and Millis, 2003). Relevant to this, Green maintains that "verbal protocols are increasingly playing a vital role in the validation of assessment instruments and methods", in that they "offer a means for more directly gathering evidence that supports judgements regarding validity than some of the other more quantitative methods" (1998, p. 03). Consequently, it can be assumed that think-aloud protocols are widely relied on in L2 research to investigate the reading process which is

generally a hidden process that cannot be easily identified through observation or quantitative assessment like questionnaires. Accordingly, Green posits that verbal protocols are "also used a means for supplementing data obtained from quantitative techniques" (ibid: 02).Then again, researchers often find problems in the way of implementing the think-aloud method. Thus, considering the way of using think-aloud protocols or verbal reports, Wade (1990) suggests a procedure for administering and scoring a comprehension think-aloud protocol.

Nevertheless, there are some issues of controversy that have been highlighted by L2 reading researchers concerning the use of verbal protocols. For example, Yoshida confirms that "verbal reports cannot provide a full picture of processing, especially when the text is so easy that reading activities are automatic and inaccessible to verbalization" (2008, p. 200). In fact, like any other research tool, verbal protocol analysis has its advantages and limitations as summarized in this table:

Advantages	Limitations
- It provides data on cognitive processes and readers' responses. - It allows readers to think aloud and demonstrate not only how to read, but also why and when they would use certain strategies. - It permits the analysis of affective processes of reading as well as cognitive processes. - It provides valuable information on the range of the processes related to reading, such as instruction, assessment, discussion and teacher decision-making. - Readers' verbal reports could be central to the development of both a common language and reading theory. - It is an excellent choice as a method for qualitative researches interested in getting a rich source of data. - It could provide information to test hypotheses and models of behaviour.	- Observers might influence how the person doing the think-aloud behaves, and subjects could only report cognition of which they are consciously aware. - Participants might edit their ideas and thoughts to the researcher. - Some mental processes could be difficult to verbalize as they depend on visual, auditory, or mathematical imagery for their execution. - Analysis of audio tape after data collection is time consuming. - Experimental task directions to subjects might elicit an inappropriate level of verbalization. - Data collection in think-aloud techniques interrupts the reading process when readers supply the running commentary. This procedure may influence the normal processes of reading and might impact the reliability of such techniques. - In L2 situations, the problem of which language the protocols will be given in, the language of the text or the readers' mother

	tongue and the interpretation problems this may entail.

Table2.9: Advantages and limitations of think-aloud protocol analysis (adapted from Tsai and Chang, 2010, Pp. 31-32)

To overcome the limitations of think-aloud techniques some researchers emphasize the importance of training in the think-aloud method to motivate subjects to verbalize their reading processes as much as possible (Yang, 2002). Accordingly, participants are supposed to practice the procedures of think-aloud protocols before being used for data collection.

In sum, similar to other research tools, think-aloud or verbal protocol analysis method is not a perfect assessment instrument of EFL reading processes. However, its validity and reliability can be guaranteed through triangulation; i.e. verbal reports have to be supported by other research measurements like questionnaires as have been explained previously or reflective journals as shown in the next section.

- *Diary studies:*

Another interesting research technique, diary writing plays a vital role in EFL reading studies. A diary is a written account of the diarist's thoughts, feelings, and experiences. Moreover, the introspected written data obtained from a diary can provide clarification to better understand the intertwined aspects which influence the process of language learning which cannot be observed directly. As posited by Pavlenko (2007, p. 165) diaries represent "the first source of information about learners' beliefs and feelings".

Furthermore, according to the literature, researchers often make distinction between a diary as an account of thoughts, experiences ...etc, and the concept of a diary study which involves writing of the diary, collection and analysis of the data obtained from the diary as well as the drown conclusions based on the analysed data (Nesic and Stojkovic, 2017, p.531). A diary study in second or foreign language teaching/learning, as put by Bailey and Ochsner, is

> "[a]n account of a language experience as recorded in first-person journal. The diarist may be a language teacher or a language learner –but the central characteristic of the diary studies is that they are introspective: the diarist studies his own teaching or learning. Thus, he can report on affective factors, language learning strategies, and his own perceptions –facets of the language learning experience which are normally hidden or largely inaccessible to an external observer" (1983: 189, in Bailey, 1991, p. 60)

As stated in the above definition, diary studies can be presented by both language teachers and learners by means of writing about their own experiences of language teaching/learning. Also worth noting is that a diary study is based on introspection. As a research technique, introspection has become widely used by language teachers and researchers to collect data about students' foreign language learning development processes, particularly those mental processes occurring in students' minds and cannot be simply observed. In this sense, Nunan (1992) defines introspection as "the process of observing and reflecting on one's thoughts, feelings, motives, reasoning processes, and mental states with a view to determining the ways in which these processes and states determine our behaviour" (p. 115). Moreover, according to Bailey (2015, p. 248), introspection falls within three types: (1) concurrent introspection (this occurs during task completion; (2) immediate retrospection (this occurs just after completing the task); and (3) delayed retrospection (implies recording events hours or more following task completion). Another classification is suggested by Perry (2011) who categorizes introspection as introspective (depicting inner processes which happen during an ongoing task) and retrospective (depicting internal processes after completing a given task) (in Nesic and Stojkovic, 2017).

On the other hand, irrespective of their structure and objective, diaries though basically represent private documents "can provide valuable insights into classroom interactions and the students' responses to their learning experiences" (Burns, 1999, p. 133). Keeping a journal or a diary provides an effective informational source for both teachers and learners. Diaries enable teachers to be aware of their students' needs and concerns, to ponder on their classroom practices, and to adopt a reflective teaching approach that may entail professional development. Similarly, for learners, using diaries can help them to know their learning styles as well as to distinguish between their successful and unsuccessful learning strategies. As claimed by Burns, diaries help "pinpoint areas of difficulty in learning in both a general and an individual sense, as well as provide feedback on classroom tasks, learning processes and strategies" (ibid). With reference to the reading skill, keeping a diary is found so useful for readers to ponder on their reading practices, so that they can be conscious about which strategies are enhancing their comprehension and critical analysis of the reading material and which strategies are not. As such diaries are effective tools for readers to adjust their reading strategies so as to be able to get the maximum benefit of what they are reading.

Nevertheless, the use of diaries as an introspective research method has often been a subject of controversy among specialists and received much criticism concerning the external validity of the instrument. Some researchers, like Nunan (1992), doubt the accuracy of the drown

conclusions which are "based on data from a single subject" and how they "can possibly be extrapolated to other language learners" (p. 123). Additionally, the reliability of the data and its interpretation is also questionable mainly in terms of the diarists' capability in verbalizing the actual thoughts they were having while doing a given task (ibid). Yet, despite some shortcomings, diaries still represent an effective introspective research tool with several advantages. Compared to, for instance, observation or interviews, diaries are more flexible in data collection as they "can be completed according to participants' own schedule" (Mackey and Gass, 2005, p. 178). Meanwhile, diarists are free to choose the topic to write about and at any time they want. In fact, this flexibility in diary writing is considered as a disadvantage by some as it produces unstructured introspective data which creates difficulty for researchers who have to find patterns in the obtained data before analysis. In fact, no research tool is found definitely perfect, yet triangulation is the best way to reinforce validity and reliability of research methods.

II.3.3.2.2. Quantitative Measurements:

Quantitative measurement relates mainly to studying the quantity of students' frequency of use or correct answers through questionnaires or reading comprehension tests. These are generally aimed at assessing background knowledge, reading strategies, and metacognitive awareness (Alderson, 2000; in Tsai and Chang, 2010, p. 29). Furthermore, quantitative data samples are based on more formal assessment tools like standard tests and inventories which contain true/false, multiple-choice, and other types of questions to which there is only one correct or relevant response as in the standardized inventories explained below.

- *Standardized Inventories*

Most of the available quantitative measurements, namely standardized inventories focus on examining metacognitive reading awareness or comprehension-based reading strategies awareness among language learners. Furthermore, the most widely cited measurements include Miholic's (1994) Metacognitive Reading Awareness Inventory (MRAI), Index of Reading Awareness (IRA) (Paris and Jacobs, 1987), besides the Survey of Reading Strategies (SORS) of Mokhtari and Sheorey (2002) which has gained ground all over the world. It is mainly concerned with measuring adolescent and adult students' metacognitive awareness as well as perceived use of reading strategies. The same survey has been used in different contexts and for distinct purposes.

In 1987, Paris and Jacobs designed Index of Reading Awareness; a 20 item multiple-choice questionnaire to measure metacognition applied to reading comprehension by third grade and fifth grade students (McLian, Gridley, and McIntoch, 1991, p. 82). Results revealed that those students who received strategy training scored better on the scale than those who did not. Nevertheless, the IRA reliability has often been questionable mainly in terms of being a valid way of measuring metacognition in reading. Relevant to this, McLain, Gridley, and McIntosh argue that the authors of the IRA "did little to determine the psychometric properties of the scale" (ibid, p. 81). Therefore, it should be used cautiously as a measurement tool of metacognition in reading.

Then again, taking into consideration findings obtained in various studies by Garner (1981; 1987) and others, and based on the IRA of Paris and Jacobs (1984), Miholic (1994) designed Metacognitive Reading Awareness Inventory which is composed of ten multiple-choice questions each followed by four answers. Respondents have to put a check mark next all the responses they think are effective or reflect the best ways of reading. According to Miholic, this inventory "should make students think about what they do while reading and help them become aware of metacognitive strategies" (1994, p. 84). Miholic also confirms that the question types of this inventory try to reflect the four specific domains presented by Jacobs and Paris (1987), namely: (1) regulation which implies monitoring and redirecting one's efforts during the course of reading to reach desired goals; (2) conditional knowledge of strategy applications; (3) planning the cognitive event; and (4) evaluation of one's processes. On the other hand, Miholic's inventory can be useful for teachers who would like to help their students achieve higher levels of comprehension, especially in terms of monitoring which is "a problem-solving process that invites critical, flexible and insightful thinking" as mentioned by the same author (1994, p. 85).

In fact, the above mentioned instruments were mainly designed to assess native speakers metacognitive awareness of reading strategies as such little has been done in the field of foreign or second language reading strategies assessment. Relevant to this, Mokhtari and Sheorey maintain that "there are several instruments aimed at assessing native speakers' metacognitive awareness of reading processes" (2002, p. 02). On the other hand, Mokhtari and Sheorey confirm that there exist no instruments for assessing ESL students' metacognitive reading awareness. As they declare, "we could not find any published instruments that are specifically designed to assess ESL students' metacognitive awareness and perceived use of reading strategies while reading for academic purposes" (ibid.). In the same vein Mokhtari and Sheorey insist that:

"even though there is some agreement among researchers that a number of reading strategies are transferable from one language to another... the existing instruments do not take into account some of the strategies that are unique to students who are literate in more than one language such as translating from one language to one's native language or using both languages when reading to maximize understanding" (ibid.)

Furthermore, from their part Mokhtari and Sheorey have marked an outstanding contribution in the field of reading strategies measurements both among native and non-native speakers of English. Based on the Metacognitive Awareness of Reading Strategies Inventory (MARSI) designed by Mokhtari and Reichard (2001) to assess reading strategies among native and non-native readers of English, Mokhtari and Sheorey (2002) developed the Survey of Reading Strategies (SORS) which is aimed at measuring ESL students reported use of three categories or factors of reading strategies. The SORS consists of three categories which group 30 items that can be categorized into three subscales or factors. The first category or factor is called Global Reading Strategies and it contains 13 items designed to assess a global analysis of texts, for example this item "I have a purpose in mind when I read". The second subscale is named Problem-solving strategies. It contains 8 items which represent asset of reading strategies oriented towards solving problems when text becomes difficult to read. One example of these strategies is "I adjust my reading speed according to what I read". The third category of strategies is labeled Support Reading Strategies and it includes 9 items. It mainly involves the use of extra reference materials like dictionaries, or taking notes, and other practical strategies that can be depicted as functional or support strategies. These can be exemplified by "I take notes while reading" and "I underline or circle information in the text to help me remember it". Moreover, the SORS consists of 5-point Likert scale (from 1= never do this to 5= always do this). The mean scores from the SORS are divided into three groups: 3.5 or higher = high; 2.5-3.4 = medium; 2.4 or lower = low.

A noteworthy fact is that, though it is internationally recognized as a reliable research instrument for measuring EFL/ESL learners' metacognitive awareness of reading strategies, the SORS has never been used in the Algerian context, according to the available literature. Furthermore, this same instrument has been employed in different worldwide contexts and for both EFL and ESP learners, but without taking into consideration the particularity of either context (Martinez, 2008; Munsakorn, 2012; Alsheikh and Mokhtari, 2011; Abu-Snoubar, 2017; Jafari & Shokrpour, 2012). As maintained by Samimi et al., despite its thoroughness Sheorey

and Mokhtari's model suffers certain shortcoming since they "look for generalizability rather than particularity of text and context" (2016, p. 112). In fact, adaptations of the SORS have been often limited to modification of some expressions or words to make it comprehensible in some contexts, or translation to other languages to measure students' use of reading strategies in languages other than English (Alhaqbani, A. & Riazi, M., 2012). Consequently, this study has pioneered the use of the SORS in Algerian context as a prior step to the introduction of critical reading strategies (see chapter three for more details).

Coming back to the focal point of this section, it can be confirmed that the field of critical reading strategies measurement has not been thoroughly considered by researchers. In that there exists roughly no academic research, according to available literature, investigating the assessment of critical reading in EFL, let alone in ESP. Moreover, most of the published researches dealing with critical reading strategies development, instruction, and/or evaluation make reference to the role of metacognitive reading strategies awareness in developing critical reading ability (Davey and Porter, 1982; Babbs, 1983; Kendall and Mason, 1982; Patching et al., 1983; Grabe and Mann, 1983; Bean et al., 1983; in Parson, 1985). However, the Watson-Glaser Critical Thinking Appraisal, one of the earliest measurement tools of critical thinking skills, has been widely used as a standardized instrument formulated by Goodwin Watson and Edward Glaser for assessing the abilities underpinning critical thinking and critical reading (Acott, 1985). The Watson-Glaser contains five different, yet interrelated, aspects of critical thinking through the following subtests: inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (El Hassani and Madhum, 2007). However, this test has been criticized for requiring an unquestionable single answer (Parson, 1985).

Perhaps, the only pioneering work in this vein was that of Larking (2017) which draws clear distinction between general reading and critical reading strategies. Larking's survey questionnaire addresses both critical reading comprehension-based strategies when reading texts for university courses. This quantitative survey contains 20 items to which students should respond using the Likert five-point frequency scale following each item. As claimed by Larking, the reading strategies contained in the survey "were based on Mikulecky's (2008) list of key reading strategies synthesized from the latest findings on reading strategies for EFL learners" (2017, p. 06). Moreover, the critical reading strategies included in the survey were chosen from Manarin et al.'s (2015, p. 5-6) criteria for critical reading skills. The survey addresses the students in a clear way through the question: *How often do you use the following reading*

strategies when reading texts for your university courses?[18] The respondents have to select from the answer options of: almost always, often, sometimes, seldom, and never.

On the other hand, the critical reading strategies and comprehension-based strategies are randomly ordered in the survey "to ensure students responded to each item independently without the comprehension and critical strategy type delineation being made explicit to them" (ibid.). It is also worth noting that Larking tried his survey with 31 students whose age range was 18-24 and they came from different Asian nations representing a total of eight distinct nationalities.

The quantitative measurements of reading strategies reviewed above are found the most pertinent to the present study. Yet, Larking's contribution is the nearest to the interest of this research. Then again, no research instrument was adopted as it is presented by its author instead they were all taken into consideration in order to design a new questionnaire that can measure critical reading strategies awareness among ESP students (at least in the Algerian context), relying mostly on Mokhtari and Sheorey's SORS in terms of form, and on Larking's questionnaire mainly in terms of content. For more details on the quantitative questionnaire designed by the researcher see chapter three.

- *Traditional tests*

As it has already been mentioned in chapter one, there exist three main types of tests: proficiency, diagnostic, and achievement tests[19]. Pedagogically speaking, a test is often perceived as a measurement tool that teachers rely on in assessing their students' classroom performance or knowledge about a given topic. As put by Richards, et al. (1985), a test is "any procedure for measuring ability, knowledge, and performance" (p. 291). In the same vein, Brown (2004) construes a test as "a method of measuring a person's ability, knowledge, or performance in a given domain" (p. 03). Accordingly, a test as a method or procedure consists of test items that constitute some sort of a measurement technique. Furthermore, the fundamental purpose of testing is to measure learners' performance, competence, or know-how through either assigning a grade/mark, or attributing evaluative qualifiers like good, fair, weak, ...etc. Additionally, a test is linked to a particular area of knowledge or field of study in our case it is critical reading particularly in terms of strategies awareness and use.

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[18] Author's italics.
[19] See chapter one (p: 44) for more details about types of tests.

Concomitantly, assessing learners' ability to read may range from simply articulating words, phrases, and sentences, as the case with beginners, to effectively constructing meaning from text as it can go further to include other skills. In this respect, Brown (2004) maintains that "the assessment of reading ability does not end with the measurement of comprehension. Strategic pathways to full understanding are often important factors to include in assessing learners." (p. 185). However, reading assessment may transcend what Brown conceives as ultimate comprehension of the reading material to encompass critical reaction to the reading material. Therefore, instead of enhancing reading strategies "for achieving ultimate comprehension" as believed by Brown (ibid), teachers should promote learners' strategies to attain ultimate critical reading and reflection as the present study suggests. Yet, in all cases the text is the common prominent feature in approximately all types of reading assessment procedures.

In fact, several factors have to be considered in text selection to determine its usefulness for measuring the required skills and strategies. These factors include: topic familiarity, language difficulty, use of non-verbal material, and the skills and strategies targeted for testing.

Text or topic familiarity implies readers' possession of adequate background knowledge about the topic. It plays an important role in the readers' ability to map the text onto their current schemata. For this, Bernitz (1985, p. 21) declares that "the less familiar readers are with the concepts of the content of the text, the more they will struggle to construct a meaning". Furthermore, several studies (e.g., Erickson and Molloy, 1983; Jensen and Hansen, 1995; Katan, 1990; Koh, 1985; in Khalifa and Vidakovic, 2010) have revealed that there is a relationship between candidates' text familiarity and their performance on EAP reading comprehension tests. Nevertheless, a high level of familiarity has to be avoided and a certain degree of unfamiliarity has to be maintained in order to engage readers' motivation as well as attention.

On the other hand, the level of text difficulty can be related to linguistic, organizational, and discoursal aspects of the text as well as to background knowledge and purpose of reading. For this end, readability formulas have been invented to check text difficulty. In fact, these formulas are mainly required for native speakers of English and rarely used for EFL contexts because of the readers' distinct language backgrounds which may entail different problems. Consequently, text difficulty can be checked by needs analysis. Moreover, high level of text difficulty can also avoided through reading test instructions as clear as possible, or within the

abilities of the test-taker, so that the latter will not be overwhelmed by the test items more than the text itself.

Furthermore, the use of non-verbal material implies test designers consideration of the quality and quantity of non-verbal data (e.g., graphs, diagrams, charts, etc.) that usually take a large part in scientific texts mainly. Meanwhile, text length is also important and it is often determined by type of skills and strategies emphasized. For instance, testing skimming requires long texts, whereas careful reading can be assessed by means of short passages. Therefore, skills and strategies also have an impact on text selection. Accordingly, comparison/contrast or problem/solution passages could be more suitable than descriptive texts when the test is aimed at measuring reading carefully to extract main ideas which are generally not explicit.

Then again, there are multiple ways and methods of designing a reading test. In that the assessment tasks that constitute the reading test may vary according to the level of the readers. Reading tests based on literacy tasks and test "recognition of alphabetic symbols, capitalized and lowercase letters, punctuation, words" (Brown, 2004, p. 194) should be used among beginners. Then, just above the level of letters and words perception, reading tasks can be designed to measure readers' ability in terms of lexical and grammatical aspects. Most appropriate tasks in this case include: multiple-choice questions (MCQ), matching tasks, editing, picture-cued, diagram labelling, and gap-filling tasks. In addition, at the level of interactive reading, tasks combine both form-focused and meaning-focused objectives but with more emphasis on meaning (ibid). At this level, besides editing (longer texts), scanning, and short-answer tasks, the reading test may contain the following tasks:

a- *Cloze tasks*: these are considered among the most widespread types of reading assessment tasks. According to Simons (1971, p. 347), "on a cloze test every nth word of a passage is deleted and a student takes the test by filling in the blanks where the words were deleted". Similarly, Brown (2004) claims that a cloze task requires the reader to close a gap in a sentence (that can be a word left out) based on both formal and content schemata as well as strategic competence.

b- *Impromptu reading plus comprehension questions*: this is typically reflected by the traditional instruction "Read the text carefully and answer the questions". This, in fact, would not necessarily entail directly stated answers in the passages; however, it can also demand the reader to possess effective reading strategies like: skimming for main ideas, scanning for details, inferencing, using text clues for word meaning.

c- *Information transfer*: this type of tasks revolves around readers' ability to understand charts, graphs, maps, etc. Here, the reader should only be able to comprehend the nonverbal input but also to show the suitable linguistic competence to interpret that information orally or in written form.

On the other hand, a further advanced level of reading measurements involves considering reading as a highly sophisticated skill or critical reading as referred to in the present study. For this, Brown prefers the term extensive reading as it is based on reading longer essays like journal articles, technical reports, and books. Test designers at this level may rely on tasks discussed previously like: scanning, editing, short-answer tasks, comprehension questions and information transfer. Additionally, tasks like skimming, summarizing, note-taking, and responding to reading, fit within the context of extensive or critical reading predominantly as explained below:

a- *Skimming tasks*: this refers to the process of quickly reading the passage, missing even some parts, for the purpose of getting the gist of the topic. In this vein, Brown views skimming as "a prediction strategy used to give a reader a sense of the topic and purpose of a text, the organization of the text, the perspective or point of view of the writer, its ease or difficulty, and/or its usefulness to the reader" (ibid, p. 213). Tasks that require the reader to skim the text may include questions like:

- What is the main idea of the text?
- What is the author's purpose in writing the text?
- What type of writing is this (expository, descriptive, etc.)?
- How useful will the text be for your (profession, academic needs, interest, etc.)?

b- *Summarizing and responding*: summary writing is also a significant technique of assessing critical reading. In this task, readers are supposed to provide a summary of the reading material that should not be more than one paragraph and should reflect the main idea and supporting ideas as well. Yet, criteria for assessing a summary, according to Imao (2001: 184, in ibid.), involve that the summary:

- Expresses accurately the main idea and supporting ideas
- Is written in the students own words; occasional vocabulary from the original text is acceptable
- Is logically organized
- Displays facility in the use of language to clearly express ideas in the text.

Furthermore, responding tasks ask the test-takers to supply their opinion on a given topic that has been tackled in a reading material. Readers, here, are also expected to constructively respond to the text through either agreement or disagreement with the author's ideas, and in both cases they should support their opinion with information from the reading material as well as their own experience. Moreover, because of subjectivity in deciding an accurate reflection of the passage, which makes summarizing and responding difficult to be scored, Brown (ibid, p. 215) suggests a holistic scoring scale for summarizing and responding in reading which:

- Demonstrates clear, unambiguous comprehension of the main and supporting ideas.
- Demonstrates comprehension of the main idea but lacks comprehension of supporting ideas.
- Demonstrates only a partial comprehension of the main and supporting ideas.
- Demonstrates no comprehension of the main and supporting ideas.
c- *Note-taking and outlining*: according to Brown, note-taking and outlining can be used to measure the readers comprehension in extensive texts. These tasks are more beneficial a strategies for retaining information through highlighting key ideas on margins or organizing supporting ideas in manageable outlines.

In fact, none of the tasks explained above can be judged as the best to assess students' reading comprehension ability. As claimed by Alderson (2000, p. 204) "it is certainly sensible to assume that no method can possibly fulfil all testing purposes". Thus, what matters most is that teachers should be aware of the actual process pertaining to EFL reading comprehension, so that they can design reliable tasks and tests that could measure and assist in promoting students' comprehension-based as well as critical reading competences.

With reference to critical reading, one example of modern popular measurement is the SAT Critical Reading Test. It is mainly designed to test native speakers' ability to read and understand written English of the level they need to get the maximum benefit from their university courses. However, this test has been also used in ESL and EFL contexts to measure learners' critical reading skills. For instance, a recent study by Par (2018) has examined EFL students' critical reading abilities using a critical reading comprehension test (CRCT) through adapting test items from the book of Mastering Critical Reading for the SAT by Peterson, and the same book was used as a supplementary reference for the critical reading course for the participants of the study. In the same vein, the present research tries to rely on Peterson's New SAT Critical Reading Comprehension Test to adapt some items for ESP students' Critical Reading Comprehension Test.

Concerning test item, the SAT critical reading tests use three types of critical reading questions (Peterson, 2005, p. 119):

- *Vocabulary-in-context questions* ask the test-taker to define a specific word in the passage.
- *Literal comprehension questions* involve the identification of information directly stated in the passage.
- *Extended reasoning questions* ask the test-taker to analyse, evaluate, and pull together information from the passage(s). These questions require finding causes/effects, making inferences, analysing, and using logical reasoning.

Eventually, most of the tasks stated above can be used in critical reading test design though no single task can be claimed to be the most appropriate. In fact, we believe that it is the degree of the answer explicitness or implicitness in the text that determines the criticality of the test. In that, test items which need answers that can be easily found in the passage or are straightforwardly and explicitly mentioned cannot be depicted as critical and vice versa. In other words, the most the answer is implicit and engages the reader into higher order thinking and reasoning, the highest is the degree of the test criticality. Yet, in most, if not all, cases ESP teachers should be aware of the importance of training their students to boost their critical reading abilities, especially in higher education. One way to make this achievable is to integrate critical reading strategies in ESP instruction as shown in the next section.

II.4. Attempts to Enhance Learners' Critical Reading

Since the 1980's, a huge interest has been revealed concerning the indispensible role of critical reading in educational progress as a pivotal skill that ought to be integrated into all disciplines and at different grade levels. However, despite its importance little has been shown as far as the way of integrating this skill in various courses as well as the best method(s) that permit(s) its promotion among learners, especially in ESP context. As posited by Patching et.al. (1983, p. 407) "The bulk of the literature on critical reading (often called critical thinking) consists of theoretical discussions accompanied by very general guidelines or strategies for instructions". In the same way, Parson confirms that "little evidence could be found in the literature of an effective method for increasing critical reading ability" (1985, p. VI). This tendency of little concerns with practical strategies for critical reading instruction has continued for both native and non-native speakers of English, as noted by Pennycook (2001, p. 82) "there has been a curious silence on concrete pedagogical matters" (in Larking, 2017, p. 54). However,

there have been considerable attempts to teach critical reading for different levels which are still being marked as a reliable reference for many researchers and practitioners. In this research, these attempts are divided into two distinct trends. The first trend can be referred to as traditional and it advocates questioning skills as the focal point of classroom practice to enhance critical reading ability (e.g., Barnes, 1979; Lehr, 1983). The second one is metacognitive and it is based on the use of strategy straining for critical reading development (e.g., Parson, 1985; Patching et.al., 1983).

II.4.1. Traditional Trends in Teaching Critical Reading:

Earliest attempts to teach critical reading were particularly interested in examining different factors that might influence critical reading development. In 1953, Maney tried to identify links between the following factors: literal and critical reading comprehension, general reading comprehension, verbal intelligence, literal and critical reading test scores and students' understanding of scientific texts (in Parson, 1985). She proved that critical reading comprehension of science material implies distinction between a set of skills, and that tests of literal reading ability could not measure critical reading proficiency in science. Consequently, Maney recommended that, as critical reading is composed of separate sub-skills, the most efficient method is to teach these sub-skills separately in order to increase students' level of critical reading ability. Examining the same factors as Maney, but within the context of social studies, Sochor (1958) found similar results and implications.

Another important attempt is that of Stauffer (1975) who tried to promote students' critical and creative reading through designing the Directed Reading Thinking Activity (D.R.T.A). As cited by Parson (1985), within this teaching approach, students are taught to: identify purposes (both individual and group) for reading, adjust reading speed, achieve reading purposes, and develop comprehension. The D.R.T.A emphasizes the following abilities (ibid, p. 88): segmented predictions, weighing evidence, organization of knowledge, determination of the quality and quantity of one's own learning, use of facts to make objective value judgements, and the ability to take backward looks. According to Stauffer, effective instruction has to be based on teaching students to find out problems, to raise their own questions, and to be able to determine the validity of their answers. For Parson, Stauffer's D.R.T.A approach closely relates to the methods and goals of advocators to metacognitive skill enhancement.

It is clear that in earlier concerns with critical reading teaching, the role of questioning was thought to be the most appropriate classroom practice that could advance students' critical

reading skills. According to Parson (1985, p. 51) "questioning is an intellectual strategy that can influence student behaviour before, during, and after reading". Some researchers argue for that questions influence both what and how a student learns (Annacone and Sinatra, 1979). Others confirm that student's effective thinking is highly correlated by the teacher's ability of questioning (Lehr, 1983; Barnes, 1979). For this, Parson adds that questions should be planned to challenge students' use of content in different ways. In that focus should be made on the quality of the questions rather than quantity. In these terms, Barnes (1979) provided a questioning classification system as a model lesson to enhance critical reading and thinking skills. The lesson is mainly built upon classroom discussion that is aimed to aid students increase, organize, and articulate their ideas. In Barnes' questioning classification system, questions belong to one of the four categories below:

a. *Cognitive memory questions*: address recall of facts or yes-no answers
b. *Convergent questions*: these require students to clarify, express in their own way find relationships, compare and contrast, or solve a problem
c. *Divergent questions*: here students should infer, anticipate, reformulate, hypothesize, solve a problem, invent or design.
d. *Evaluation questions*: these ask students to judge, evaluate, defend or justify a choice

According to Barnes, the most logical sequence of questioning is the one which begins by questions of fact; then questions based on convergent thinking, and ends with questions that need divergent or evaluative thinking. Similarly, Thompson (1979) distinguishes between eliciting and probing questions. Being the first asked on a given topic, eliciting questions can be either convergent (low level thinking processes) or divergent (more thought processes). However, probing questions are more concerned with high level thinking processes. This type of questions is mainly adopted when students fail to give a correct response to an eliciting question. Yet, like Barnes, Thompson focuses on the planning of questions in the reading lesson. As maintained by Parson (1985) "educators should concentrate on identifying and classifying questions which would really emphasize higher level skills rather than concentrating on classifying the kinds of questions teachers ...ask" (p. 58).

Additionally, Acott (1985) reported that Hess, Shafer and Morreau (1975) also approach critical reading development through questioning. Their technique requires readers to first skim the text to identify the author's main idea, to formulate questions and think about expectations while reading the selection. As cited by Acott (1985, p. 15) a critical reading instruction,

following Hess and colleagues, should be based on questioning through posing the questions below:

1. What is the source? Is it reliable? Is it up to date?
2. What is the main idea or author's purpose?
3. How is the information presented by the author?
4. What is the tone of the material?
5. Does the writer use persuasive or emotional language?
6. Is the material based on fact, inferences, or opinions?
7. Are there any weaknesses in the author's reasoning?
8. Was my way of thinking changed by what the author said?
9. Was my interest aroused in what I was reading?

Considering the above perceptions of questioning in reading, it can be assumed that questions play a vital role in the process of reading comprehension as well as critical reading. However, it is the role of the teacher to determine the level of thought process undergone by the students according to the type of the questions asked. Low level thinking processes usually require literal questions or convergent questions; whereas high level thinking processes are generally triggered by evaluative (critical) questions or divergent questions. In this line of thought, Fagan, Hasster and Szabo (1981) believed in that training teachers in higher level questioning strategies would help students respond with high level responses (in Parson, 1985, p. 87).

On the other hand, another technique of teaching critical reading was proposed by Clifford (1980) who argued for the significant role of writing in the reading processes. As cited by Lehr (1982), Clifford's technique revolves around writing activities which permit students to perceive how writers generate, develop, clarify, and organize critical ideas before, during and after reading. This technique is based on four stages of reader-text interaction: (1) involvement, in which students develop a personal interest in the text; (2) perception, in which they contemplate their first personal responses by noticing the details in the text that elicited that response; (3) interpretation, in which they shift their attention from inside to outside and begin to draw meanings from the text; and (4) evaluation, in which they make judgements about the text.

This perspective of instructional research in reading critically has been supported by other researchers. In his attempt to teach critical reading, Lehr (1983) suggested the use of both questioning and writing. According to this author, effective questions and writing activities should be based on Bloom's Taxonomy both in fiction and non-fiction materials. In this

taxonomy, six levels of cognitive skills are highlighted: (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis, (5) Synthesis, and (6) Evaluation. Well framed questions should reveal all the levels of the Taxonomy. Similarly, writing activities have to be structured according to the six levels of cognitive skills used before, during, and after reading. As pointed out by the same author (ibid, p. 1032), proceeding through these activities students are supposed to:

a. Find definitions for certain words (Knowledge)

b. Retell an episode in their own words (Comprehension

c. Change a scene or character from a story to a real-life one (Application)

d. Analyse the cause of an event and its effects (Analysis)

e. Relate a personal experience to demonstrate some point in the selection (Synthesis)

f. Discover the opinion of two other people concerning the selection and comprehension (Evaluation)

From his part, Cunningham (1980) suggests a two-phase model lesson to teach critical reading. Cunningham's argument is based on that many teachers perceive students as being unable to offer any response to what they have read. These students, according to Cunningham, think that reading is to memorize teachers' interpretation of pieces of writing as they believe it is the only correct interpretation. To overcome this misconception of reading, Cunningham proposes a two-phase lesson where reading comprehension and critical reading are considered as separate yet complementary phases. In the first phase teachers should focus on increasing students' comprehension of a piece of writing through reading the title of a selection silently, look at illustrations and pictures if any, and make predictions about the content of the selection. Next, the students are required to read the selection and compare their predictions to the reading. The main objective of this phase, as claimed by Cunningham, is that students should have:

> "the fullest understanding possible of the meaning(s) of the text, including both literal and inferential comprehension. Knowledge of word meanings, knowledge of the relationships between concepts as cued by grammatical information, and the use of reason to follow the logical progression of ideas of the discourse are all required for comprehension to occur" (ibid, p. 166)

On the other hand, the second phase should be based on critical reading. The latter is mainly practiced through teachers' questions that seek to elicit students' perceptions of a piece of writing which are generally justified in terms of standards provided by the students themselves. According to Cunningham, students' standards of evaluation do not matter a lot as the essential

thing is that they are becoming conscious of the standards they use to evaluate their reading. As such, it can be deduced that even Cunningham's approach to developing critical reading is based on questioning.

Another attempt to teach critical reading was made by Thompson and Frager (1984) in which, as cited by Taglieber (2000), they suggest five guidelines for teachers:

1. Stimulate personal interest
2. Generate active/interactive participation by all students
3. Use prior student knowledge and experience
4. Facilitate and encourage skill transfer
5. Extend comprehension instruction beyond the 50-minutes class period.

Furthermore, history, as believed by the same authors, is a suitable content area to show to students the importance of reading critically. In another work, Frager and Thompson (1985) proposed consideration of conflict in reading material as an efficient tool to help students improve reading comprehension as well as reading critically. Their approach to critical reading teaching based on conflict material is composed of four phases (p. 678):

1. Have students conflicting accounts of the same topic;
2. Increase cognitive dissonance by eliciting from students explanations and arguments supporting each side of the conflict;
3. Model critical reading of the account;
4. Extend the lesson to a point where students' cognitive dissonance is resolved by additional reading and thinking skills previously modelled.

One way to proceed through these steps is to provide students with conflicting accounts on a given subject. Teachers should inform their students that their purpose for reading is to achieve a tentative conclusion about which account is close to the "truth". In doing so, students are expected to provide strong arguments and valid explanations of the merits of each account. According to the authors, the main objectives underpinning this critical reading lesson revolve around: (1) elicit from the students all the facts and inferences which define the divergent perspectives in the accounts; and this can be best achieved through questioning students and modelling for them the critical reading skills; and (2) create additional cognitive dissonance, more tension which motivates students to want to read and inquire further to resolve the conflict on the subject.

In fact, though apparently different, the above model lessons to teach critical reading are conventional mainly in terms of making the principle of questioning as its focal point in developing students' ability to read critically. These critical lessons which are shaped within a cognitive framework have often focused attention on increasing students' epistemology of critical reading rather than its effective practice. In that the task of reading critically is always presented in the form of a list of questions which are supposed to be critical then try to elicit answers from students in the form of sound arguments and inferences. But what if these students failed to answer these questions? What if they cannot provide inferences and strong arguments? Which behaviours or actions should these students adopt and/or adapt to in order to overcome their failure in reading critically? In other words, which strategies can help these students become practical critical readers who are able to question themselves critical questions rather than giving answers to a predetermined list of questions only? It is this kind of inquiry that traditional approaches to teach critical reading failed to address and recent attempts to develop students' critical reading abilities have tried to answer. These attempts thought of metacognitive strategies training as a good alternative to enhance students' critical reading skills.

II.4.2. Strategy Training Approaches to Critical Reading Development

Development in cognitive psychology and the growth of the concept of metacognitive strategies helped researchers in education to prove that students who are "consciously aware of what they are doing learn new thinking processes and strategies the most effectively. Such learners are aware of their comprehension and can apply the most appropriate strategies when comprehending a text" (Larking, 2017, Pp. 54-55). Consequently, practitioners have started to base their instruction on developing metacognitive skills or comprehension monitoring in order to enhance students' comprehension ability. As revealed by Parson (1985, p. 92), the best approach to increase metacognitive strategies is: (a) to provide direct explicit instruction and practice in designing and executing plans and other metacognitive experiences, (b) to suggest different text genres for reading, and (c) to provide the opportunity to participate in creative writing experiences (Babbs and Moe, 1983). It has also been shown that students' metacognitive strategies can be advanced through: (a) instructions in predicting outcomes and reader's self-regulation, (b) integration of prior knowledge with text content, (c) training students to monitor their comprehension by self-questioning while reading (Kendall and Mason, 1982). Furthermore, Palincsar and Brown (1983) thought that the best cognitive skills training program should focus on skills training, self-regulation training, and awareness training. Relevant to this, they

developed a "skills package" that is aimed to enhance such abilities: summarizing, questioning, predicting and clarifying. These skills, in fact, are also counted for in critical reading.

Moreover, as cited by Patching and his colleagues (1983), Pearson et al. (1981) studies the effects of systematic instruction in comprehension-based reading skills. In addition, other researchers revealed that metacognitive (or "learning to learn") skills can be systematically taught to students. Relying on teaching strategies primarily based on previous successful work with direct instruction in comprehension, Patching et al. tried to teach students how to read critically (i.e., how to analyse and evaluate certain types of arguments presented in text mainly in terms of detecting inferences of faulty generalizations, false causality, and invalid testimonial). The findings of the study demonstrated that systematic instruction using modelling and explicit training in overt strategies was significantly more effective compared to conventional ways of teaching based on workbooks or no intervention.

Two years later, Parson (1985) attempted to increase students' critical reading abilities by means of metacognitive strategies training believing in that "metacognitive strategies encourage a conscious awareness of and/or control over one's own mental processes" (P. VI). According to Parson, critical reading implies "the ability to judge or evaluate written materials and to compare them against some norm or standard" (ibid). Parson hypothesized that strategy training which has been revealed to enhance general comprehension could be specifically adapted to increase critical reading ability. Relevant to this, four strategies were selected by the author for instruction, namely: questioning, summarizing, predicting, and speculating about the writer's tone or purpose. The results of the study, however, revealed limited statistically significant effects of instructional procedures. And that was, according to Parson, due to the following reasons:

- Lack of appropriate testing instruments,
- Lack of transference from oral tasks involved in instructional procedures to written requirements of testing instruments,
- Poor attitude of students, and
- Short time span of study.

Perhaps another reason could be emphasis on metacognitive strategies alone and apart from critical reading strategies. For we believe that metacognitive strategies training makes only one step in the holistic process of the critical reading act. Furthermore, the critical skills have to be taught specifically as critical reading ability cannot be assumed on the basis of good general or

literal comprehension (Eller and Wolf, 1966). Consequently, developing critical reading ability should be based on training in metacognitive as well as critical reading strategies.

On the other hand, assuming that university students are not graduating with enough literacy skills and their ability for critical reading does not advance automatically, Wilson et.al. (2004), therefore, believe in that these students need an active intervention from their teachers through extensive scaffolding in academic reading. As claimed by Wilson and her colleagues "effective classroom practices in developing critical reading can be gathered under the rubric of scaffolding" (2004, p. 03). In this context, scaffolding implies requesting students to do work of a much higher standard than their capacities, but within a supportive environment which should enable them to do so. The scaffolding strategies, suggested by the researchers, to foster students' abilities towards reading critically include (p. 04):

- Embedding the reading into the assessment;
- Classroom discussion and lectures;
- Careful selection of reading materials of different genres;
- Focusing on metacognitive reading strategies; and
- Linking the reading to the students' interest

Furthermore, Wilson et al. recommend that critical literacy practices must be enhanced on a longitudinal basis through integration into course design. For that students stop using the critical reading skills which they had learnt once the supportive teaching practices were discontinued. Consequently, practitioners are required to (p. 08):

- Demand critical reading of students through assessment and intimate integration of reading with subject content
- Guide students to readings which offer both high support and high challenge
- Provide explicit instruction in critical reading to raise students' metacognitive reading awareness
- Provide feedback on reading to reinforce critical reading strategies

Relevant to this, increasing university students' critical reading capacities has become an urgent need. This need to develop students' critical reading of academic texts would not only improve their higher order thinking skills but even assist a lifelong quest for advanced professional experiences. This kind of recommendation and the like reviewed above were made for practitioners dealing with critical reading development for native speakers of English. So

what about contexts where English is taught as a foreign language? Have there been any attempts to enhance critical reading among ESL/EFL in general and ESP learners in particular? If yes, what significant results have been reported and what recommendations are mostly advocated for? If no, why?

In fact, interest and attempts to teach critical reading among EFL learners have been gaining momentum just recently. Moreover, several researchers have provided evidence that their teaching programs were successful in developing learners' critical reading abilities. One of the important contributions to teaching critical reading in ESL/EFL contexts was made by Crismore (2000). For this researcher "university students who speak English as a second language or as a foreign language can learn to critically read print, visual, and electronic texts by using certain strategies" (p. 03). And because most of these students, as the author adds, "come to universities without prior schooling opportunities and experiences that encourage or require ... critical reading" (ibid), teachers have to show their students how to read critically. Relevant to this, Crismore suggests one strategy that can help develop students' critical reading ability. In this strategy, students are required to read their assigned text twice: the first reading is for comprehending while the second one is for evaluating. The next step involves the students to annotate (i.e., to write their notes and comments in the margin) the text. Then, some of these annotations are selected by the students to be further elaborated through "writing down the author's exact words together with their reactions, responses, comments and questions" (ibid, p. 01). This is similar to a study conducted by Bretzing and Kulhang (1979) where student-developed margin notes were examined. After reading a part of a given text, students were required to paraphrase or summarize in annotation in the margins of the text. The researchers believe that students' margin notes helped them to achieve a deep analysis of the text. Not only this, Crismore also proved that annotation helps to increase students' interest and motivation. Therefore, annotation is highly emphasized in this study, along with other critical reading strategies, as an effective strategy in promoting critical reading among ESP students.

Correia (2006) also tried to develop university EFL students' critical reading through the use of newspaper articles. Her way of teaching was based on Brown's (1994) three phases of teaching reading, namely: *Pre-reading discussion*, *While-reading tasks*, and *Post-reading exercises*. Accordingly, a warm-up activity was designed to discuss different types of newspapers and magazines and their typical readers. To activate background knowledge, students were asked to read the headline and the first sentence of the article and attempt to guess its content. Furthermore, as a pre-reading task, students were required to suggest two questions

which would likely be answered in the text. In order to answer the questions, the students, then, were supposed to read the article as a while-reading activity. Then, in the post-reading activity, the students were required to answer three questions proposed by the teacher and which relate to the author's choice of verb tenses and words. These questions were aimed to guide students in reading critically and discover whether the article was purposefully written to inform, influence, or entertain. Correia concluded that this way of teaching critical reading, though it can be time consuming, helped the students a lot to develop as critical readers.

In the same line of research, Lestari (2015) attempted to expose the process of teaching critical reading in an Indonisian EFL classroom to help students improve their critical ability. The study was achieved through two phases. In the first preliminary phase, the researcher introduced the teaching program, and negotiated the topics for reading with the students. In the second phase, the explicit teaching program based on critical reading principles, Lestari adopted the procedure of teaching critical reading suggested by various researchers (Ennis, 1990; Reinchenbach, 2001; and Wallace, 2003). As a first step in the explicit instruction, the researcher opted for the explanation of critical thinking definition as the basis of critical reading. After that, students were explicitly taught critical reading strategies following the three-phase procedure to teach critical reading skills called for by Wallace (1992), and it includes: (1) Pre-reading activities, in which students' background knowledge is activated through a short talk about the topic related to a given text; (2) While-reading activities, in which students are required to put the learnt skills into effect through reading and analysing the given text to enhance knowledge about the critical reading skill explained and modelled by the teacher and its use in analysing the text by the students; and (3) Post-reading activity, wherein students are instructed to provide justified answers to several open-ended questions that followed a text. Furthermore, at the end of the teaching program, students were asked to write reflective journals indicating what had been learnt, advantages of the activities, and difficulties encountered during the class.

The findings of Lestari's study imply that critical reading increases students' opportunity to discuss and share their ideas, articulate their opinions, and empower their judgements toward texts. For this, she recommended the necessity of using authentic materials, as well as careful arrangement and thorough preparation of classroom management to guarantee successful critical reading teaching.

In the same vein, in a very recent study, and like Correia, Ratri (2018) suggests the teaching of critical reading strategies to EFL students through Brown's three phases of teaching

reading, but with special focus on the while-reading phase where critical reading strategies are supposed to be introduced. This phase, according to Ratri, contains the main reading activity which should be based on Bloom's taxonomy in formulating questions that can support the promotion of students' higher order thinking skills. Ratri concluded that the use of questions strategy in teaching critical reading increases students' attitude towards the reading activity and improves their motivation in the teaching learning process. Moreover, within a student-centered learning approach, Ratri assumed that the teacher can encourage students to share their ideas and opinions through group work or discussion on a given non-fictional reading. Teachers' feedback is also expected to be provided by the end of discussion.

However, despite her significant contribution Ratri did not mention types and quantity of questions that can foster students' critical reading. Moreover, the emphasis on only one phase at the expense of other two phases in the reading process is not evident to improve the critical reading activity as a holistic process. All phases of the critical reading practice should be given equal thoughtful attention to attain the maximum benefit from the reading activity in achieving higher order thinking skills progress.

Furthermore, within an action research, Nasrollahi et al (2015) conducted a study to encourage Iranian EFL students to use critical reading strategies through an explicit instruction that was based on cognitive domain of Bloom's Taxonomy to enable students to ask more organized higher order questions. The instructional procedure of Nasrollahi et al. was realized throughout three phases. First, *lesson planning and preparation phase*, in which the researchers followed the ordinary syllabus of teaching reading in Iranian EFL classrooms, and the main objective was to plan a lesson based on identification and understanding the frequency and types of EFL learners' critical reading strategies employed habitually before, during, and after reading. Second, *instruction phase*, in which the study was conducted through putting into effect the lesson plan prepared in phase one wherein each lesson was started by a short explanation of intended critical reading strategies that might be one of these: annotating, previewing, scan and skim, facts vs. opinions, drawing conclusions, monitoring one's own comprehension, summary, and paraphrase. Additionally, this phase underpins three important steps, to wit: observing students' objectives, performances, and behaviours; assessing students' performance and behaviour; and affirming and remediating through providing positive feedback to encourage and assist student's improvement, as well as understanding the problems the students may encounter. Lastly, assessment and evaluation phase, in which the researchers try to review lesson outcomes and students performance; identify successes/strengths and weaknesses/gaps; and plan remedial

actions and ways of improving instruction and learning. One implication from Nasrollahi et al.'s study is that instructing struggling EFL readers in critical reading strategies is a key factor for enhancing their critical reading and higher order thinking ability.

Another significant study was carried out by Albeckay (2013) among EFL university students in Libya. The researcher investigated the lack of critical reading strategies among the students and tried to provide an innovative critical reading program to improve their skills. The program contained ten sessions that lasted two hours each. Moreover, the sessions were conducted following three stages. In the first stage, the teacher provides instructions on the theoretical analysis of what is to be learnt. Then he indicates the critical reading strategy opted for while the students are guided through the think aloud procedures. Second stage implies that the teacher guides the students through collaborative work to support each other in acquiring the critical reading skills suggested by the teacher. In the last stage, students are encouraged to work independently with every student supposed to answer a short evaluation questionnaire. Eventually, Albeckay confirmed that the program improved the ability of students in reading academic material critically. For this, he highly recommended further research on critical reading strategies in Libyan universities and other Arab countries.

With reference to reading in ESP, very few studies have considered the development of ESP students' reading abilities. Moreover, available studies have focused on tackling different variables affecting comprehension-based reading abilities but never make reference to the skill of critical reading. For example, Erfani, Iranmehr and Davani (2011) tried to enhance ESP students' reading comprehension through visualization which means the ability to construct mental images while reading. Another study by Reza (2013) investigated the effectiveness of reading strategy training on ESP readers' proficiency levels. Many other studies followed the same line of enquiry; i.e. developing ESP students' reading ability by means of raising their awareness of various reading strategies through explicit instruction in reading strategy training (Dreyer and Nel, 2003; Amiri and Sarlak, 2010; Mirici and Demirel, 1999). In a different study, Weisi attempted to enhance ESP learners reading comprehension through explicit teaching of grammar. Findings indicate the positive effect of explicit teaching of grammatical structures on advancing the participants' level of reading comprehension. Nevertheless, as far as critical reading is concerned, available literature does not reveal any study dealing with critical reading development among ESP learners. The only work recorded in this vein is a workshop by Patch and Aboualzm (2016) wherein emphasis is put on the importance of enhancing ESP learners'

critical reading/literacy that can be achieved following the five steps adapted from Abednia and Izadinia's (2011) suggestions for practicing critical literacy in EFL/ESL reading:

a. Familiarize learners with the meaning and value of critical reading/literacy by means of the Survey of Reading Strategies (SORS) of Mokhtari and Sheorey (2002)
b. Negotiate readings by including learners in the selection of readings process
c. Ask critical questions to direct and motivate learners towards using critical reading strategies
d. Discuss questions collaboratively
e. Write reflective journals

In fact, the lack of literature on critical reading in ESP context entails a large gap in the field of ESP research that has to be filled in urgently; a fact that fosters the impetus behind carrying out the present research.

All in all, the first assumption to be drawn from the research literature on teaching critical reading just reviewed demonstrates the significant role of critical reading development in enhancing language learners' reading comprehension both among native and non-native speakers of English. Attempts to teach critical reading have followed approximately the same instructional procedures wherein the concept of questioning as the focal point of critical literacy development is highly focused on. The studies analysed above also indicate the primordial impact of explicit instruction that is aimed at training students to read with a critical eye on raising learners' awareness of metacognitive knowledge about critical reading strategies (e.g. predicting, previewing, analysing, self-regulation, evaluation, summarizing, reflecting...) that would enable them develop into constructively responsive readers. It is also shown that in strategy-training based instruction the teacher plays a vital role in increasing students' interest and motivation towards the reading activity through appreciating their participation in selecting different types of readings. Students are also encouraged to participate in class discussion and collaborative work that fosters their critical reading abilities through sharing their ideas and expressing their opinions. The literature reveals as well the existence of various wide gaps in the field of ESP research particularly as far as critical reading development among ESP learners is concerned. Relevant to this, the present research tries to fill in one of these gaps mainly in terms of promoting ESP students' critical reading through integrating critical reading strategies into ESP instruction. For how this can be fulfilled, some procedures are put forward next, but not before giving rationale for promoting critical reading strategies among ESP learners.

II.5. Rationale for Promoting Critical Reading Strategies among ESP Learners

Undeniable is that critical reading has become the focal point in different disciplines in higher education not only to face the overwhelming amounts of information available today from distinct sources and in various forms but also to heighten learners' interest in reading and therefore enhance their motivation towards advanced academic achievements. As emphasized by Acott (1985) "high school students and college students are being expected to read and think critically, to evaluate a vast amount of new knowledge" (p. 13). Furthermore, revealing awareness of critical reading strategies among EFL learners has become a must, especially in ESP context which is more reflective of real life environment where students are required to develop not only communication abilities but to acquire specialized knowledge as well. Accordingly, ESP teachers are urgently called to integrate critical reading strategies into their ESP instruction for several reasons, among which we can cite the following: (1) to promote strategic reading to achieve higher levels of comprehension; (2) to heighten students' motivation towards reading in general and critical reading in particular; and (3) to enhance students' academic achievement.

It is quite important to note that the concept of critical reading has been just recently gain momentum as a vital component of higher education curricula, and ESP is not an exception, especially after the paradigm shift that has raised the need to change from traditional towards critical perspectives of teaching ESP[20]. In fact, this interest in critical reading emanates principally from the fact that reading is perhaps the unique process through which students can acquire deep knowledge of modern science and technology as well as sharpen their practical skills in a world of ever increasing challenges. Nevertheless, it is widely perceived that students lack interest in reading, even at the university, particularly when instruction is based on traditional lecturing. The same can be said for the Algerian context where different studies (Boudaoud, 2016; Bouklikha, 2016) have proved EFL students' reluctance towards reading in general, let alone critical reading. Therefore, any learning process should be based on the development of students' critical reading and thinking "to help students evaluate critically the knowledge and information which is put before them" (Acott, 1985, p. 13). However, developing students' critical reading is, in fact, tightly linked to enhancing appropriate strategies that enable

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[20] See chapter one for more details on the paradigm shift from traditional towards critical perspectives on teaching ESP.

students to analyse, evaluate, monitor, and regulate their thinking process; hence the importance of critical reading strategies instruction.

According to available literature, though limited, the studies dealing with critical reading mainly in EFL context have capitalized the paramount role of developing critical reading strategies among students as well as its positive correlation with other foreign language learning variables like motivation, strategy awareness, and academic achievement. For instance, some researchers report that critical reading strategies are vital as they help students to become better readers and thinkers (Alderson and Urquhart, 1985; Wallace, 2003). Others claim that critical reading strategies enable good readers to read selectively (Duke and Pearson, 2008), particularly in this era where the number of available reading texts is augmenting enormously. Likewise, Hudson (2007) believes that critical reading strategies have to be taught to engage learners in their higher order thinking process which can allow them to read effectively (in Kien and Huan, 2017). Similarly, the findings of a recent study on teacher beliefs about the role of integrating critical reading strategies in EFL instruction reveal that teachers held strong belief about the pivotal role of including critical reading strategies in their classroom practices (ibid).

Integrating critical reading strategies in the foreign language classroom would empower learners' critical reading abilities such as analysis, questioning, and evaluation, which in turn could enable them to achieve full understanding of texts; hence reaching higher levels of comprehension and increasing thinking about the text. In that, as posited by Pierce (2006), reading as a thinking process requires sophisticated strategies for better comprehending rather than getting the superficial aspects of a text. Furthermore, the importance of critical reading strategies has been proved in different contexts and occasions. As it has been argued elsewhere in this research, successful readers are usually ready to repair comprehension since they are aware of how and when to deliberately use effective strategies. Moreover, critical reading strategies are useful even for struggling readers as these strategies can be "a key toward helping them to improve critical reading, critical thinking, and higher order thinking ability" (Nasrollahi, et. al., 2015, p. 15). Additionally, the positive effect of critical reading strategies on reading comprehension has been confirmed by several researches dealing with the relationship between critical reading strategies and reading comprehension (Arju, 2010; Ghahraki and Sharifian, 2005; Nasrollahi, 2007; in Rajabi and Tabtabaee, 2015). From their part, Rajabi and Tabtabaee found out that explicitly teaching critical reading strategies is necessary for tackling reading comprehension and more effective critical reading. They also argued for the significant role of teaching critical reading strategies and suggested that "formal training of critical reading

strategies can effectively fortify the learners' ability to read critically" (ibid: 87). Similarly, in Libya a study by Albekay (2014) proved the effectiveness of a critical reading programme in improving undergraduate EFL students' reading abilities.

Also worth noting is that critical reading has been judged to play a fundamental role in the development of other reading micro-skills like vocabulary retention. As put forward by Yu-Ling (2005), with reference to vocabulary learning, the main problem of EFL learners has often been how to recall and retain newly acquired vocabulary. In fact, several studies have discovered that critical reading can positively influence vocabulary learning and help students retain words recently learned. In this vein as well, many studies found that critical reading strategies assist EFL readers' retention of vocabulary (Khabiri and Pakzad, 2012; Talebi and Marzaban, 2015). Moreover, Grabe (2004) confirms the existence of a meaningful relationship between language learners' reading strategies and their vocabulary knowledge. Research has even proved the usefulness of critical reading as a strategy for learning collocations (Tabrizi, 2016).

On the other hand, several studies have shown the strong relation that exists between critical reading strategies instruction and enhancement of students' motivation towards reading. In 2009, Icmez conducted a study on critical reading lessons and motivation among students of English language teaching prep classes. The results of the study revealed students' improvement of not only their communication but even their motivation towards reading lessons. Another study by Koupaee Dar et al. (2010) has shown that critical reading strategies instruction increases students' motivation to learn English and read critically. Moreover, in a study conducted by Alem (2019), results demonstrate that practicing critical reflection in the reading classroom has significant positive effect on students' motivation while learning critical reading strategies. Relevant to this, Ebrahimi and Rahimi posits that "critical reading is a means to make learners' more empowered language users and such an approach to reading can be motivating for EFL students" (2013, p.11).

Furthermore, many studies have found that critical reading teaching advances students' academic achievements. According to Abd Kadir, et al. (2014), if teachers could help students develop critical reading skills,

> "[t]hey would definitely have good reading comprehension skills and could be successful in schools. Students with good comprehension skills could perform well in any subject/course because they have developed the critical reading skills to not only understand but analyse any text

given to them. This will also help them to score better in any
tests or exams they have to take in schools." (p. 209)

Abd Kadir et al.'s argument can be supported by several researches, in fact. For instance, in 2006, Cam investigated the link between critical reading and Turkish lesson academic achievement levels, and he found that there is an important relationship between critical reading skills and academic achievement level in Turkish lesson. Another study by Guzel (2005) also found that the teaching of critical thinking skills enhanced students' academic achievement levels. In the same way, David (2009) examined the teaching of critical reading and discovered that the experimental group attending critical reading activities revealed better performance than the control group (in Akin et.al., 2015, p. 2448). From their part, Akin et al. investigated the effect of a science and technology lesson arranged within the framework of critical reading on students' academic achievement, critical thinking, and critical reading skills. The results of the study uncover the outperformance of the experimental group in terms of academic achievement, critical thinking and critical reading skills. Moreover, the difference in achievement was statistically significant. Similarly, Cooper and White (2006) found out that critical reading enhances students' reading comprehension achievement scores. The same findings were also confirmed in another study by Karabay (2015) which involved the effects of critical reading instruction on the pre-service teachers' reading comprehension achievements. As maintained by Par (2018, p. 74) all the studies investigating students' critical reading ability "reveal significant roles of critical reading ability on students' success in academic study".

Eventually, it is evident that critical reading abilities help students to analyse, synthesize, criticize and evaluate the reading material. When students are trained in critical reading, they will be capable to distinguish between cause/effect, fact/opinion, compare and contrast relationships in texts and among texts, as well as adopt a critical stance towards the writer's view presented in the text. Put another way, being exposed to critical reading strategies, students will develop into critical thinkers who would not take things for granted or accept ideas at face value. Consequently, students have to be taught not only how to transform orthographic signals into language, or use knowledge in context to understand what is read. Rather, they have to read between the lines and beyond the lines; they have to read for deeper meaning. Furthermore, a pedagogy that neglects critical reading would undoubtedly create passive readers who would usually accept information and ideas in any text given to them, and that could never challenge a writer's tone or purpose of writing through valid and strong judgements. For this, we do not want our students to be submissive readers, especially in the case of foreign language learning. Instead

we need "aggressive" readers who are able to resist all sorts of dare. As mentioned by Abd Kadir, et al. (2014), Scholes (1985) emphasizes that in reading the ultimate goal has to be critical reading, and adds that in this era of manipulation, the worst thing teachers can do is to foster in their students an attitude of reverence before texts.

Last but not least, it is worth noting that most, if not all, of the above reviewed studies consider critical reading in EFL contexts. Yet, with reference to ESP context, and with the absence of available literature dealing with development of critical reading strategies among ESP students, the present research suggests that critical reading can possibly reveal the same positive effects for the ESP classroom mainly in terms of promoting students' strategic reading to achieve higher order thinking abilities, increasing motivation towards reading, as well as developing their academic achievements. As for whether critical reading can be integrated in ESP classes, the answer is yes since "for teaching critical skills, there is no limitation as to age, knowledge, intelligence, level of schooling or subject matter" (Parson, 1985, p. 44). Consequently, as cited by Parson (ibid), Taschow (1972) emphasized that "teaching critical reading must be in keeping with students' learning activities, background experiences and their general and specific language development". Furthermore, this study argues for the importance of teaching critical reading to ESP students by means of explicitly integrating critical reading strategies into ESP instruction through effective classroom practices. More insights on procedures for integrating critical reading strategies into ESP instruction are exposed in the subsection that follows.

II.6. Procedures for Integrating Critical Reading Strategies into ESP Instruction:

As it has already been reviewed the advantages of critical reading practice have given it a particular position in 21st century higher education. Most world countries are shifting their pedagogies from traditional passive spoon-feeding perspectives to current autonomous critical practices. Critical reading is not specific to any particular discipline, but it is an integrative skill to any pedagogical subject matter and at all grade levels regardless of learners' age and other related variables. Even in foreign language education, critical reading has been gaining momentum, particularly in recent decades. Many EFL/ESL studies have been conducted and proved the principle role of critical reading in enhancing learners' comprehension of academic material, reading strategies, reading interest and motivation, and academic achievement, among others. However, in ESP context, available literature reveals a remarkable lack of research highlighting the active role of advancing ESP learners' critical reading in sharpening their

performance in various language learning aspects. Therefore, the present research endeavours to seriously take this issue into consideration through investigating the possibility of teaching critical reading to ESP students in order to promote their ability to understand, analyse, and evaluate field-related material written in English. Particularly in this section some procedures are provided to shed light on the way of integrating critical reading strategies into ESP instruction.

In fact, many researchers have supplied convincing arguments for the primordial role of explicit instruction in developing critical reading strategies. In that, as critical reading revolves around multiplex cognitive processes, instruction, therefore, has to be direct and overt. As such all the various stages in the strategic process of critical reading need to be thoroughly presented and modelled by the practitioner. Also known as direct instruction, explicit instruction, is often construed as "a series of supports or scaffolds, whereby students are guided through the learning process with clear statements about the purpose and rationale for learning the new skill, clear explanations and demonstrations of the instructional target, and supported practice with feedback until independent mastery has been achieved" (Archer and Hughes, 2011, p. 01). This positive meaning should be differentiated from the negative meaning that explicit instruction may imply. In that, direct or explicit instruction can denote undesirable meaning, especially for those who perceive it as "the pouring of information from one container, the teacher's head, to another container, the student's head." (Brown and Campione, 1990, in Rosenshine, 2008, p. 04). Moreover, effective explicit instruction that is aimed to maximize student achievement should be based on six instructional functions as conceived by Rosenshine (1983) in the table below:

Instructional functions	Explanation
1. Daily review	- Checking homework and previous learning
2. Presentation	- Preview and set goals - Introduce new material in small steps - Model procedures - Explain thoroughly and clearly
3. Guided student practice	- Encourage high frequency of responses - Provide immediate feedback and prompts to all students - Ensure high level of success - Practice has to be continuous until fluency is reached
4. Feedback and correction	- Reteach using more details

5. Independent student practice	- Monitor initial attempts - Practice is continued until skills become automatic
6. Weekly and monthly reviews	- Reteach when necessary

Table 2.10: Rosenshine's six instructional functions (adapted from Rosenshine, 1983, p. 04)

As can be noted in the table above, efficacious explicit instruction can be achieved through a series of instructional supports. As a first step in this series, the teacher has to logically select and organize content that should be later on broken down into smaller instructional units that respond to students' cognitive abilities (e.g., prior knowledge, attention ... etc). When it comes to delivery, clear explanation and depiction of the instructional units is required, then guided practice and timely correction and feedback should follow. At this stage, teacher's intervention is highly recommended until the students show evident fluency in using the learnt skill. Here, teacher's control is gradually withdrawn and the students move towards autonomous practice. Eventually, consolidation of the learning can also be guaranteed through weekly and monthly reviews.

Furthermore, explicit instruction has been advocated as the best teaching practice that can ameliorate language learners' strategies, especially in reading (Rosenshine, 1978; Archer and Hughes, 2011; Pearson and Dole, 1988). Following this line of thought, various teaching models have been suggested. Concerning language learning, two important learner-centered teaching models have characterized explicit instruction, namely: Styles and Strategies-Based Instruction (SSBI) and the Cognitive Academic Language Learning Approach (CALLA). In SSBI, learning styles and strategies are made the focus of the explicit instruction with the aim of making learners understand their preferred ways of learning, and the reinforcement of learning style and strategies integration in all classroom activities in order to retain acquired knowledge (Ajideh, Zohrabi and Poularvar, 2018, p. 79). On the other hand, the CALLA model that was proposed by O'Malley and Chamot (1990) maintain explicit strategy instruction as a prerequisite for enhancing L2 acquisition. As a matter of fact, the CALLA perspective has been appreciated by several language teaching researchers as it incorporates research findings from different previous studies on learning strategies instruction. The CALLA model includes six stages as mentioned below:

1. *Preparation*: This implies teacher's identification of the students' current learning strategies such as activating prior knowledge

2. *Presentation*: This phase requires the teacher to present the new strategy to be learnt through naming, modelling, or explanation as s/he can ask the students whether they have used it before or not.

3. *Practice*: In this phase, the students are given the chance to practice the new strategy. Gradually, teachers should encourage independent strategy practice.

4. *Evaluation*: this phase involves the students to assess their own strategy use just after practice in order to determine the worthiness of their learning.

5. *Expansion activities*: this phase refers to the transfer of learnt strategies to new activities by the students. As such students are supposed to integrate learnt strategies into their existing schema.

6. *Assessment*: the last phase requires the teacher to evaluate students' implementation of strategies and its effect on their practice.

O'Malley and Chamot's model has been approved for integrating strategy instruction into academic content-based activities. It has also been appreciated for its effectiveness for language learners of distinct grade levels.

Within the same line of enquiry, significant research has been put into effect as far as the reading skill is concerned. Relevant to this, Pearson and Dole (1988) investigated explicit comprehension instruction that is different from traditional paradigm of teaching reading. For them, in explicit comprehension instruction, teachers "model or provide explanation of WHAT, HOW, WHY, and WHEN a comprehension strategy ought to be used. ... teachers [also] provide *guided* practice in which they gradually and slowly release responsibility for task completion to students until they are able to complete the task on their own." (1988, p. 08). Accordingly, for Pearson and Dole, explicit instruction should be built upon the stages mentioned hereinafter:

1. *Modelling*: this stage needs teachers' focus on identifying the strategy and how to apply it to a given reading selection. This is generally achieved through teachers thinking aloud while reading.

2. *Guided practice*: this phase involves both teachers and students working together throughout the process of strategy application. The teachers' role here is to collaborate with students to overcome their difficulties or confusion by supporting them with feedback and encouragement.

3. *Consolidation*: in this step teachers consolidate, aiding students understand the strategy and its use, as well as why and when it should be used (i.e., for what type of readings or assignments)

4. *Independent practice*: here students are expected to rely on themselves for determining strategy choice and its application. Meanwhile, teachers are supposed to follow and intervene whenever necessary to prevent students' failure.

5. *Application:* in this crucial step as Pearson and Dole posit, students are asked to apply the strategy learnt in real text instead of workbook pages. Concomitantly, the emphasis should be put on the WHEN and the WHY of the strategies.

Furthermore, according to Winogard and Hare (1988), there are five aspects that teachers ought to consider for effective strategy instruction:

1. Describing the strategy to the students

2. Explaining the importance of the strategy and raising students' awareness about the advantages of the strategy use.

3. Revealing how to use the strategy successfully

4. Demonstrate where and when a strategy should be used

5. Show students how to evaluate their successful/unsuccessful utilization of the strategy.

With reference to the above strategy instruction constituents, Duffy, Roehler and Harmann (1985) suggest a mental modelling process wherein the teacher should think aloud about the processes happening inside his/her brain while constructing meaning throughout a given text. As such, this strategy instruction technique permits students to imitate the teacher's behaviour in order to be capable to practice the think aloud procedure by themselves. In the same way, Grant (1994) believes in that strategy instruction should include five components:

1. Informed training about how, when, and where to apply a strategy, thus readers can see the value in using it.

2. Modelling and scaffolding through think aloud to inform students what actually occurs during the reading process.

3. Self-monitoring and evaluation to help readers transfer strategy knowledge to different readings.

4. Practice to help students become self-confident and autonomous in using strategies.

5. Transfer strategy use to other contexts.

Ostensibly, all the reviewed researches above show a clear consensus on the importance of modelling in strategy instruction. They also focus on the explanation of each strategy before discussing where and when to employ it. Moreover, awareness-raising, self-monitoring, and evaluation are, indeed, of the essence for these authors in comprehension strategy instruction. Nevertheless, one specific feature for Grant's model is its emphasis on transfer of strategy use that would encourage students to use the learnt strategies in contexts other than the classroom. Furthermore, the above models have been widely adapted by several studies (Larking, 2017). These studies revealed that procedures for comprehension strategy instruction including strategy explanation, teacher's modelling, and students' practice benefited both native and non-native language learners.

Coming back to critical reading, and as it has already been discussed, developing students' critical reading ability cannot be achieved unless a direct overt instruction is adopted. According to Larking (2017), critical reading guided instruction should focus on, besides general reading comprehension or interpretive strategies, the integration of a set of critical reading strategies which include:

1. *Integrative knowledge*: students' ability to make connections across texts and subject areas
2. *Contextualization*: locating a text in its sociocultural and temporal context in order to be able to determine author's purpose and motivations in maintaining certain viewpoints.
3. *Reflection*: this is considered as a key practice in promoting critical reading through reflective question prompts that deepens students' critical analyses.

From their part, Abdenia and Izadinia (2011) introduced five steps for integrating critical reading literacy to teaching reading in ESL/EFL contexts:

Step 01: Familiarizing learners with critical literacy: This implies, for instance, providing students with short and simple readings about concepts of critical literacy and critical reading. Teachers can also explain this through discussing with the objectives, advantages, and limitations of critical reading and how it can be practiced.

Step02: Negotiating readings: This step requires students' involvement in the process of choosing the readings. Teachers at this level can provide some guidelines that permit students to select passages that suit their reading interests and abilities.

Step 03: Asking critical questions: The main purpose of this step is to foster students' autonomy in reading critically through developing their own questions to elicit author's attitudes and

examine values introduced in passages. Meanwhile, teachers are supposed to deliver initial modelling of various kinds of questions to aid students frame their own.

Step 04: Discussing questions collaboratively: Based on the socio-constructivist argument that knowledge is constructed by means of social activities which require sharing ideas and experiences (Vygotsky, 1978), the researchers argue for the use of collaborative activities like classroom discussion to enhance critical reading among students. Accordingly, students should be encouraged to express their ideas and discuss their opinions about a given topic with their classmates. Concomitantly, teachers should monitor students' group work and maintain a positive environment to enable the promotion of successful interactive skills mainly through giving immediate feedback and tips on effective communication.

*Step 05: Reflective journals***:** This last step allows students to reflect on their own viewpoints as well as those of their peers', teachers', and authors', after classroom discussion. Reflective journals can also be considered as a collaborative activity when students are given the opportunity to share and comment on each others' writings.

Nevertheless, as maintained by Abednia and Izadinia, the above five skills to improve critical reading cannot be realized unless some limitations are overcome, to wit: students' lack of motivation to enhance their intellectual skills and creativity; limited language proficiency of low-level L2 learners which prevents them to deeply treat materials; and students' age that the researchers consider as a challenge in critical classes, but they recognize that even children are ready to develop their critical abilities within adapted contexts.

As a matter of fact, despite its merits, implementing explicit strategy instruction has shown some limitations. It can be seen that it is time consuming as instructional units need to be further divided into smaller steps that can be overtly modelled by the teacher to be practiced by students first under the teachers' guidance then independently until fluency is realized. Yet, this fluency, in its turn, constitutes another limitation in terms of the extent to which this fluency can be decontextualised. In other words, to what extent are students able to reveal a continuous autonomous use of the learnt strategy outside the classroom and away from teachers' control? Therefore, "consideration must be given to how students retain and develop their skills over time" (Larking, 2017, p. 57). As another limitation, researchers point out teachers' difficulty in modelling comprehension strategies as they are not familiar with the think aloud procedures. For this, Pearson and Dole (1988) add "it is highly unlikely that some teachers can or will model or share their own thinking about comprehension processes publicly, some will be embraced to do

so, others will deny that it is their responsibility to engage in such efforts, and still others will be unaware of how they think when they comprehend written texts" (p. 10). Consequently, to implement effectively in classrooms, teachers have to be trained in modelling and guided practice. However, these limitations should not prevent teachers from attempting to integrate critical reading into their instructions.

Bearing in mind the reviewed literature concerning explicit instruction and its effectiveness in enhancing learners' strategy use, especially in terms of critical reading, this study tries to integrate critical reading strategies into ESP instruction adapting in such a way the most prominent findings in this vein. As mentioned earlier, several investigators (Winograd and Hare, 1988; Duffy et al., 1988; and Grant, 1994) agreed on that three significant stages underpin reading strategy instruction, namely: explanation and orientation, modelling and scaffolding, and then application and evaluation. Furthermore, three forms of knowledge have to be emphasised in each stage. These forms of knowledge consist of declarative knowledge (what to know), procedural knowledge (how to know), and conditional knowledge (why to know). Relevant to this, critical reading strategy instruction in the ESP context of the present study is supposed to be based on the following aspects: students' prior knowledge activation, strategy identification, modelling, practice, scaffolding, participation, reflection, and further practice. It is worth noting that these procedures also require reviewing previously learnt strategies before a new one is introduced. As for increasing students' interest and motivation, the teacher also attempts to implement some pedagogical practices deemed significant for fostering students' integration and heighten their motivation towards the course. Some examples of these practices include: negotiating course aspects with the students, integrating students in the selection of readings, encouraging classroom discussion, and collaborative work, among others.

Eventually, all this theoretical review cannot be assumed to be effective unless a practical intervention is carried out. Consequently, the coming chapter is devoted to shed light on the field work of the study to further reinforce the validity and effectiveness of this research.

Conclusion:

Chapter two reviewed the literature referring to the development of critical reading strategies among ESP learners, mainly in terms of pertinent theoretical issues and pedagogical implications. The most important objective was to shed light on the second key word (Critical Reading) that underpins this research through highlighting its related variables which may sustain this study in answering the research questions raised in the general introduction,

particularly concerning the importance of teaching critical reading to ESP students and the different procedures deemed necessary for integrating critical reading strategies into ESP instruction.

In this line of thought, the chapter started with exploring the concept of reading as a multifaceted process through reviewing the various approaches to understanding the nature of the reading activity. In addition, the chapter highlighted the shifting paradigm from comprehension-based to critical reading in ESP in order to go beyond the literal understanding of scientific texts. In this vein, different attempts to identify the concept of critical reading were examined for the purpose of attaining a pedagogically workable definition of the critical reading act. It is also in this section that the significance of critical reading as the salient attribute to 21st century higher education was scrutinized that would further sustain the researcher's argument for maintaining critical reading as a requirement for comprehending scientific texts principally in ESP context.

After that, the chapter moved on to discuss the crucial issues and implications of promoting critical reading strategies in ESP. As such, this section proceeded by providing an overview of language learning strategies and their importance for ESP learners. Then, critical reading strategies were investigated, predominantly in terms of identification, classification, and measurements. That would likely help the researcher to reach a clear conceptualisation of critical reading strategies which might facilitate the selection of those strategies found relevant for ESP context. Meanwhile, the exploration of both quantitative and qualitative measurements of critical reading strategies would provide more insights on the employed research tools and their worthiness for the study.

Finally, the last sections of chapter two reviewed literature concerning previous attempts to enhance language learners' critical reading, and put forward rationale for promoting critical reading strategies among ESP learners. By the end prominence was given to pertinent procedures - both existing and those suggested by the researcher- for integrating critical reading strategies into ESP instruction. All this literature is perceived fundamental in answering though partially the research enquiry and confirms though theoretically the research hypotheses. For how the study is accomplished practically, the coming chapter will supply further insights.

Chapter Three

Research Context, Methods and Procedures

Introduction:

Now that the theoretical part is thoroughly accomplished, this third chapter is put forward as the first step to realize the practical part of the study. Chapter three, as its title indicates, tries to provide a thorough description of the research context as well as the methods and procedures followed in promoting critical reading strategies among first year engineering students at the ENSH. Relevant to this, the main aim of this chapter is to give an overview of how the study was designed methodologically and the instrumentation employed in conducting the different steps of the research process. Therefore, the chapter includes: presentation of the research context, description of the participants, description of the research instruments, and the data collection procedures and analysis.

III.1. Context Description:

Before delving into the presentation of the research methodology pursued in accomplishing this investigation, it is found of great importance to first explore the context of the study. This would likely provide a clear image of the situation wherein the research was realized. Therefore, this section starts with giving an overview on the National Higher School for Hydraulics (ENSH). Then, it tackles the predetermined conditions for being able to be admitted as student in hydraulics engineering classes. Finally the status of ESP at the ENSH is thoroughly explored from different angles.

III.1.1. The National Higher School for Hydraulics: An Overview

The National Higher School for Hydraulics of Blida is a public institution of higher education that is under the supervision of the Ministry of Higher Education and Scientific Research. In 1972, and by order n° 72-8 of March 21, 1972, the School was established and nominated as the Institute of Hydro-techniques and Improvement (IHB) and became part of the State Secretariat of Hydraulics. Then, in 1985, the Institute was transformed into the National Higher School for Hydraulics by Decree n° 85/258 of 29/10/1985, but it was not until 1998 that the School became dependent to the University of Saad Dahleb Blida1, under the supervision of the Ministry of Higher Education and Scientific Research. After that, the executive Decree 98/58 of 11/02/1998 declared the ENSH as an independent higher education institution; i.e., it no longer belongs to the University of Blida1. Furthermore, the last execution Decree n° 16-176 that was issued on June 14th, 2016 set out the organization of the establishment as a higher school through fixing the typical status of higher schools.

The ENSH ensures training in different graduate and post-graduate courses:

- Diploma of State Engineer in Hydraulics (Ingénieur d'Etat en Hydraulique)
- Master Degree in Water Engineering
- Magister Degree in:
  a. Hydraulics Development
  b. Water Engineering
- Doctorate Degree in Hydraulics (LMD system)

In addition, the ENSH has other missions. First, it offers post-graduation training specialized in mobilization and valorisation of water resources. Second, it provides continuing education programs designed to cater for the needs of engineers and technical managers in the field of water resources. Moreover, reinforcing the entrepreneurship culture through training future elite, leaders of projects mainly aimed at establishing a company by means of Formation Inginieur Entreprendre (FIE) in collaboration with the National Institute of Applied Sciences (INSA) of Lyon. The ENSH is also an active member of the Free Entrepreneurship Program organized by the group of Indjaz El-Djazair.

As far as employability is concerned, the ENSH works hardly to facilitate the integration of its students into the labour market through cooperation with various domain-linked institutions and companies both in the public and private sectors, among which we can cite the following:

- Centre Administration of Water Resources
- Department of Water Resources (DRE and DHW)
- Company of Water and Sewarege System of Algiers (SEAAL), Oran (SEOR), Constantine (SEACO)
- Local communities

III.1.2. Access Conditions to Hydraulics Engineering Classes:

Admission into first year engineering classes of hydraulics can be attained through passing a national entrance examination to higher schools. After getting the Baccalaureate exam with an average that should not be less than 14/20, students wishing to pursue their studies in the ENSH have to attend preparatory classes of Science and Technology for two years. After accomplishing the two academic years, all the students have to pass a national entrance examination in order to

be able to enrol in first year engineering classes of hydraulics. Additionally, priority is given to the Bac series mentioned below in order of priority:

- Mathematics
- Mathematical techniques
- Experimental sciences

Once in third year engineering classes, students have to register in one of the following hydraulics specialities:

1. Urban Hydraulics:
- Design of Drinking Water Supply Systems
- Design of Sewerage Systems
2. Hydrotechnical Constructions and Development:
- Hydraulic Engineering and Development
- Design of Hydrotechinical Constructions
3. Irrigation and Drainage:
- Design of Irrigation – Drainage Systems
- Reuse of Wastewater
4. Reuse of Treated Wastewater (this speciality has been added just recently 2019-2020)

In addition, the ENSH is trying to enlarge the scope of promoting competence through ensuring new training offers primarily in hydraulics related disciplines like: Hydraulics Constructions and Environment, and Hydropower.

On the other hand, courses are delivered in the form of lectures, tutorials, and practical work which is pursued in 14 laboratories and three experimental platforms available at the school. Students' acquired knowledge is also reinforced through programmed visits to infrastructure and construction sites (dams, pumping stations, purification and treatment plants, desalination plants, and irrigation perimeters), as well as practical traineeship in the workplace like dam sites, irrigation perimeters, hydrotechnical structures and design offices.

III.1.3. The Status of ESP at the ENSH:

As it has already been discussed elsewhere in this thesis, ESP has recently become an interesting area of teaching/learning in all Algerian higher education institutions and the ENSH is not an exception. All stakeholders, administrators, teachers, and students, usually reveal a

positive attitude towards the importance of using the English language in the field of hydraulics. Nevertheless, this positive attitude has often been hindered by several controversies that underpin the real situation of ESP teaching at the ENSH.

Generally known as Technical English, the English language is considered as a compulsory module that all students have to attend throughout all their academic years of graduation. The English language course is allotted one hour and a half per week. Sometimes it is taught in small classes wherein the number of attendees ranges between 15 and 20, and other times it is taught through lecturing where the number of students exceeds 100. Concerning the context of this study which deals with first year students mainly, English is programmed during the second semester in the form of tutorials (small classes).

In fact, for several reasons the English language delivered in engineering classes at the ENSH can by no means be called English for Specific Purposes. Firstly, the principle of needs analysis which makes the basics of ESP has never been taken into consideration. The English course is taught according to teachers' beliefs and attitudes rather than in regard to students' needs, wants, and lacks. Those beliefs are mainly centered on selecting texts from any source and reading it in different nonstrategic ways to be followed by comprehension questions and grammatical exercises. These practices reinforce the dominations of a teacher-centered classroom at the expense of students' integration. This case occurs at the ENSH as in many other Algerian higher education institutions because of the lack of qualified ESP teachers. Teachers involved with the English language in technical institutions are principally graduated in EFL, i.e. in general English that is predominantly based on studying English literature and civilization. This fact makes most English teachers confused about how to deal with ESP contexts. In the worst cases they rely on teaching grammar particularly conjugation of verbs, and in the best ones, they try to bring texts to the classroom and ask the students to read them silently then loudly; after that they raised some comprehension-based questions and the ESP lesson is accomplished according to them.

When it comes to the process of evaluation, a final examination is the principle way of assessing students. Furthermore, continuous assessment is also taken into consideration before the exams. This kind of assessment is mainly done through some written tests of 20mn or half an hour without a previous warning in most cases. These tests, besides the final examination, are based on what has been taught in the classroom, i.e. grammar and reading comprehension. As such, teaching English in field-specific domains like hydraulics is not given importance,

particularly in terms of the need of considering language in relation to academic or professional contexts. Put another way, teaching specialized content through the English language is not in fact considered in practical terms.

The situation of the English course is also worsened by the time allotted as well as the coefficient given to the course. English is allocated one hour and a half only per week which is often programmed by the end of the day schedule. This fact makes students reluctant to attend the English class. Moreover, the coefficient given to the English course which is in most cases 1 pushes the students to show less motivation and interest if compared to specialty modules. This lack of interest is revealed in missing English sessions that usually results in failure of the ESP course.

On the other hand, the objectives of the course as highlighted by the administration of the ENSH have never been achieved. In other words, though the English teaching at the ENSH is aimed at enhancing students' ability to read field-specific documents written in English and increase their vocabulary and use of hydraulics terminology, students are still unable to read effectively and understand specialty related materials in English. This has often led to hindering students' motivation as well as achievement in the English language course since the way this course is delivered to them has never responded to their expectations.

Eventually, teaching reading which makes the basics of the ESP context has to be rethought thoroughly. It is believed that developing students' ability to understand texts written in English can never be occurred through the way the reading skill is dealt with in the current situation of ESP at the ENSH. Asking students to read silently then loudly would never enable them to discover the essence of the reading act. Students in a higher institution like ENSH are not in need of combining letters into words then words into phrases and sentences, but they need to learn how to deconstruct and reconstruct meaning. They need to learn how to read critically. They need to be conscious about the different strategies that can foster their competence of reading analytically. They need to learn how to read and not what to read. Therefore, this study suggests the promotion of critical reading strategies among ESP students at the ENSH. This is highly believed as an efficient procedure to help students promote their critical reading strategies awareness and use, which may in turn enhance their motivation towards English in general and reading in particular, develop their ability to read strategically which can foster their comprehension-based as well as critical reading ability to understand field-specific documents, and last but not least enhance their academic achievement. Empirically, the issue of promoting

critical reading strategies among ESP students is supposed to be achieved through an intervention wherein critical reading strategies are explicitly integrated into ESP instruction. For how to do so, more insights are given in what follows.

III.2. Research Methods and Procedures:

III.2.1. Research Design:

In order to fulfil the practical requirements of the present study, the researcher opted for an embedded research design. According to Tavakoli (2012), embedded research is a type of a mixed methods research design which is often employed when:

> "[a] researcher needs to answer a SECONDARY RESAERCH question that requires the use of different types of data within a traditional QUANTITATIVE or QUALITATIVE RESEARCH design. To accomplish this, one type of data collection and analysis is embedded or nested within the design associated with another type of data. For example, a researcher may need to embed qualitative data within quantitative EXPERIMENTAL DESIGN and will conduct qualitative INTERVIEWs during the research study to understand the reasons for certain participants' behaviours" (p.188)

Following the above arguments, promoting ESP students' critical reading strategies at the ENSH involved the researcher to embed qualitative data within a quasi-experimental design. Relevant to this, the quantitative data obtained from pre- and post-tests and the critical reading awareness questionnaire is deemed significant to find out the effect of the explicit critical reading strategies instruction on students' critical reading strategy awareness and use as well as academic achievement. Yet, as the variable of reading strategy awareness and use is tightly linked to other factors like students' motivation, attitudes, performance ...etc, it is found necessary to explore these factors through embedded qualitative data obtained by means of students' reflective journals.

Furthermore, it is worth noting that the quasi-experimental design represents the dominant research method of the present study. According to Seliger and Shohamy (1989), quasi-experimental designs operate "under real-life conditions and not necessarily with groups specially constituted for the research" (p. 192). This kind of experimental research fits better within contexts where administrators "are generally unwilling to disturb their ongoing programs and allow reorganization of classes in order to randomize the assignment of subjects to different

experimental groups" (Wallace, 1998: 148). Accordingly, because of the overcharged schedule of first year engineering students at the ENSH as well as the strict rules of the school, the researcher was not permitted to reorganize the first year classes into different experimental groups. Consequently, the experimental and the control groups of this study are constituted from the six classes which already exist in the real context.

Eventually, the research design of this study falls within the paradigm of experimental research wherein variables can be controlled and manipulated. As put forward by Selinger and Shohamy (1989), experimental research is mainly concerned with "studying the effects of specified and controlled treatments given to the subjects usually formed into groups" (p. 136). The treatment, as the central component of experimental research, represents the independent variable of the research and denotes the controlled and intentional experience that groups might have in order to measure its effect (ibid.). In the case of the present study, the critical reading strategies explicit instruction is the treatment (independent variable) that the researcher wants to measure its effect(s) on ESP students' critical reading strategies awareness and use by means of a quasi-experimental design which has both pre- and post-tests, experimental and control groups, and random assignment of subjects as it will be explained next.

III.2.2. Participants:

The population of the present research is represented by 115 students enrolled in the first year engineering classes at the ENSH of Blida, Algeria, during the second semester of the academic year 2016-2017. However, only 110 subjects were intentionally taken into consideration in data collection and analysis as the remaining (5 participants) were eliminated because of either being absent or giving incomplete responses to the research instruments namely the questionnaire and the test. Moreover, the age of the participants ranges between 19 and 23 years old.

Furthermore, worth noting is that the participants of the study had been studying English for at least 7 years during their pre-university education. After passing the Baccalaureate exam and before being able to attend first year engineering classes, those students had to accomplish two years of preparatory university studies in Science and Technology wherein English is also taught as a compulsory module. After that, only those who were able to pass the national entrance examination to higher schools could enrol in first year engineering classes at the ENSH. As such it can be assumed that the participants of this study represent the elite of the university community.

Then, for the purpose of our quasi-experimental study, six groups of first year engineering classes, which already existed as formed by the school authority, were randomly assigned into 4 groups of maximum 20 members per group (total 65 students) that constituted the Experimental Group, and 2 groups of 22 and 23 members respectively (total 45 students) that served as the Control Group. To control the independent variable and measure its effects, the Experimental Group received the treatment (explicit instruction in critical reading strategies) while the Control Group received no treatment; then the researcher compared the performance of both groups with and without treatment. Also worth noting is that the selection of first year engineering students was done on purpose as the researcher believes that introducing critical reading strategies training in the first year would not only provide students with a solid basis for pursuing the English course in the next two academic years (at the ENSH, the English language is also taught to 2nd and 3rd year classes), but even reinforce their English language learning as a lifelong experience.

III.2.3. Instrumentation:

Instrumentation, or data collection tools, refers to the different research instruments used by the researcher to gather all type of information -from the participants- thought relevant to fulfil the requirements of a study. For the case at hand, in order to find out the effects of the treatment, and following the needs of the embedded design, the researcher opted for the use of pre- and post-tests, pre- and post-questionnaires, and reflective journals. Using at least three distinct research instruments for collecting data is referred to as triangulation in scientific research to control the various variables within the study, as well as to confirm and validate the research results. Also worth mentioning is that the research tools employed here were piloted prior to the main study, and then revision and modifications were made where necessary and according to the findings of the pilot phase. These findings will be discussed next, but not before providing the description of each research instrument, justifying its choice, and clarifying the aim of its use.

III.2.3.1. Critical Reading Pre- and Post-Tests:

The test is considered as a typical research tool in experimental research designs, especially in studies dealing with language learning skills like reading. According to Tavakoli (2012), a test is:

"any procedure for measuring ability, knowledge, or performance. It is a set of stimuli presented to an individual in order to elicit responses on the basis of which a numerical score can be assigned. This score, based on a representative sample of the individual's behaviour, is an indicator of the extent to which the subject has the characteristic being measured" (p. 657)

In experimental research pre- and post-test are used to elicit information from the participants before and after an intervention in order to measure its efficiency. Accordingly, as cited by Djoub (2017, p. 240), Griffee maintains that the aim of the pre-test is to reveal "what the situation is before the intervention or treatment is administered" while the post-test reflects the effects of such treatment (2012, p. 91).

The Critical Reading Test used in this study was adapted from Peterson's New SAT Critical Reading Comprehension Test[21]. The original test contains two short passages each followed by multiple choice questions. In the adapted test, the researcher kept the same passages and questions, and added some open-ended questions for both passages. Some of these questions were aimed to check the participants' comprehension-based reading, for example "What is the passage about?" Other questions were meant for measuring their critical reading ability like "Do you agree with the author's idea? Justify your answer?" Also worth noting is that both passages were tightly linked to the participants' study field, i.e. hydraulics, as the first dealt with global warming and the second discussed the geology of the Andes Mountains.

Eventually, by the end of the test, the participants were required to answer some questions which pertain to difficulties encountered while doing the test (e.g. were the passages difficult to read?). Moreover, to know whether participants' difficulties relate to comprehension-based or critical reading abilities, this question was added "Which questions were found difficult and which ones were found easy to answer?" This would help the researcher to make a final decision concerning the possibility of integrating critical reading strategies in ESP instruction, precisely for first year engineering students at the ENSH. In other words, in case students show more difficulties with comprehension-based questions, it would not be the right time to introduce critical reading strategies. However, in case comprehension-based questions represent no difficulty for our students that would be a plus for the researcher's motivation towards promoting ESP students' critical reading strategies at the ENSH.

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[21] For more information about this test see chapter II.

III.2.3.2. Critical Reading Strategy Awareness Questionnaire:

Questionnaires are predominant in conducting different types of research, especially in foreign language area. The importance given to the questionnaire stems from the fact that unlike other research instruments, it is flexible, comprehensive and less time consuming. Questionnaires, as pointed out by Johnson, "require less time, and therefore less expense, than do interviews or observations" (1992, p. 113). The questionnaire is flexible especially in terms of administration as it can be administered by the researcher himself or assigning someone else in the same domain. Moreover, the questionnaire is comprehensive because it can cover a large number of research participants whatever the way of administering it; i.e. hand to hand or via technology devices like e-questionnaires or e-mails. Yet, what is perhaps most important in using questionnaires is the fact that they are less time consuming. For sure conducting an interview or classroom observation would take more time than administering a questionnaire.

As it has already been confirmed measuring critical reading strategy awareness has not been thoroughly investigated by specialists among EFL learners, let alone ESP learners. According to the literature, most studies recorded in this respect have focused attention on metacognitive reading strategies awareness for developing reading abilities among both native and non-native speakers of English. Relevant to this, different questionnaires and inventories have been developed. For example, Paris and Jcobs (1987) designed Index of Reading Awareness (IRA), and based on the latter Miholic (1994) developed the Metacognitive Reading Awareness Inventory to assess English native speakers metacognitive awareness of reading strategies. In EFL, Mokhtari and Reichard's (2001) Metacognitive Awareness of Reading Strategies Inventory (MARSI), and Mokhtari and Sheorey's (2002) Survey of Reading Strategies (SORS) marked an outstanding contribution in the field of reading strategies measurement, especially among non-native speakers of English. Recently, the MARSI and the SORS have been translated into various languages and used in different contexts to measure both EFL and ESP learners' metacognitive awareness of reading strategies when reading academic or school related material in English[22].

On the other hand, the aspect of metacognitive awareness of reading strategies has often been thought of as the focal component of critical reading development by many researchers (Parson, 1985). This belief can perhaps justify specialists' reluctance in suggesting an efficient tool for measuring critical reading strategies awareness among EFL/ESP learners. Since the

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[22] See chapter II, p : 75.

appearance of the Watson-Glaser Critical Thinking Appraisal[23], no other assessment tool has been recorded as more efficient than the contribution of Larking (2017). Larking's survey questionnaire draws a clear distinction between comprehension-based and critical reading strategies that EFL students use when reading texts for university courses[24]. Therefore, Larking's contribution was found so useful for the construction of our questionnaire.

In fact, the development of the Critical Reading Strategy Awareness Questionnaire was not easy for the researcher as it has been realized through different trials and errors. At the beginning of the research, and based on the argument that critical reading can be developed by means of raising language learners' metacognitive awareness of reading strategies, we opted for the use of Mokhtari and Sheorey's SORS since it is generally judged as effective even for ESP students (Martinez, 2008). During the administration of the SORS, students were required to respond to the items of the survey, i.e. respond to the strategy that correspond to their way of reading, and by the end they were asked to mention other strategies/ways/manners they use/do when reading materials in English. The students were also asked to make comments concerning the difficulty of understanding the items and their organization within the questionnaire.

After the collection and analysis of data in this primary step of research, the researcher discovered that the SORS does not correspond to the ESP context. In that many respondents have revealed some strategies they employ while reading in English and which are not included in the SORS. Some of these strategies are cited below:

- Translation into not only the native language which is Arabic, but also into the first foreign language 'French'
- Seeking help of classmates, English teacher, subject specialists, particularly when meaning cannot be achieved even through translation.
- Checking understanding through discussion with classmates, English teacher, subject specialists.
- Make a list of new words and terminology to learn and build vocabulary.

In addition, ESP students perceived the categorization of the questionnaire items into global, support, and problem-solving strategies as being ambiguous and strange for them. Consequently, an adapted version of the SORS has been suggested by the researcher. In the adapted version the researcher kept the same form of the original survey and added new items

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[23] Ibid, p : 76
[24] Ibid.

which are considered as particular to ESP context at least in Algerian universities (see Appendix A). Additionally, taking into consideration O'Malley and Chamot's advice (1990) that "the optimum way of grouping strategies" is to "minimise potential learner confusion" (in Zhang, 2008, p. 99), the adapted version also reveals another reorganization of the strategies into: Pre-reading, While-reading, and Post-reading strategies. This simple categorization is found better to respond to the linguistic level of ESP students since they are not language specialists.

Nevertheless, even after adapting the SORS, the researcher was still not convinced that this questionnaire can really represent the critical reading strategies needed in the ESP context under study. After reviewing the literature related to the notions of critical reading, critical reading strategies and ESP, and thanks to insights taken from Larking's (2017) article about Critical Reading in the Advanced English Language Classroom, besides discussions with EFL teachers who had already experienced ESP teaching, it was possible to design a new questionnaire that can be used to assess ESP students' critical reading strategy awareness when reading academic documents in English.

In fact, different procedures were undertaken during the development of the questionnaire in order to ensure its content validity as well as its reliability. The first draft of the questionnaire, which included 45 items, was given to 5 ESP specialists, from both national and international universities, who were asked to review the items and determine whether they were valid to measure ESP students' critical reading strategy awareness while reading academic material in English. All the reviewers agreed on the effectiveness of the questionnaire in measuring ESP students' critical reading strategy awareness in general, and added their comments concerning the amelioration or omission of some items. For example one reviewer from Saoudi Arabia commented "I recommended properly reading for Mokhtari and Sheorey who are undoubtedly prominent in this academic field, reading strategies. Moreover, it would immensely valuable for your research to include a section that addresses how individuals deal with scientific terms while reading since your research targets the ESP students". The draft was also checked and revised by the supervisor of this research. After several revisions, taking into consideration the comments of the supervisor as well as the ESP specialists, some items were omitted and others reworded.

In the next step, the revised draft of the questionnaire which contained 38 items was piloted on 30 first year students at the ENSH who were also asked to add their comments in terms of difficulty and suggestions in case of using other strategies which are not mentioned in

the questionnaire. Once again, considering the results of the pilot study, the items of the questionnaire were reduced to 33. This 33-item questionnaire of critical reading strategy awareness, mainly designed for ESP students, was then finalised after discussion with the supervisor.

On the other hand, the reliability of the questionnaire was measured by means of Cronbach's alpha coefficient, a measure of internal consistency that is often utilized to check the reliability of questionnaires. An adequate reliability is demonstrated by a Cronbach alpha value of about 0.70 and more; thus, any construct under 0.60 has to be revised. Using Cronbach alpha, the questionnaire proved to be a highly reliable measure of critical reading strategies awareness (r=0.880) as shown in the next table:

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,880	,880	35

Table 3.1.: Reliability statistics of CRSAQ

Furthermore, in terms of content, the Critical Reading Strategy Awareness Questionnaire contains four sections (see Appendix B). The first section entitled students' profile seeks information about the participants' gender, age, years of studying English, and how do they perceive their level in English (poor, fair, good, or excellent). The second section is aimed at finding out the participants' attitudes and motivation towards reading in English. This would hopefully help us determine whether the suggested instruction would affect ESP students' motivation towards reading in English or not. Moreover, section three examines kinds of difficulties our students encounter when reading texts in English. Knowing about learners difficulties would undoubtedly guide the researcher into reshaping the framework of different classroom procedures while integrating critical reading strategies into ESP instruction. Eventually, it has to be noticed that sections 1, 2, and 3 are together intended to check the validity of the participants' responses to section four.

Section four makes the most significant part of the questionnaire as it seeks information about students' reported use of critical reading strategies while reading field-related documents in English. This section contains 33 items with a three-point Likert scale which includes three response options ranging from 1= "I never do this" to 3= "I always do this". In addition, the 33

statements, that describe the different critical reading strategies, deemed necessary for ESP students while reading critically field-related material in English. These statements represent seven types of critical reading strategies, namely: planning, schema-activation, questioning and inferring, annotating and analysing, self-regulation, and evaluation strategies.

All these strategies are considered indispensible to effectively and significantly accomplish the process of the critical reading practice which, in this study, is structured into three different yet highly overlapping phases, to wit: the planning phase, the interpretive phase, and the evaluative phase as shown in this table:

Phase	CRS
Planning phase	Planning Strategies • Identify your goal and objectives to increase your motivation to read • Preview the doc to find out its relevance to your reading goal and objectives Schema-activation Strategies • Brainstorm/externalize ideas that you already know about the topic of the text • Use surface features and organizational clues to identify genre of the text (descriptive, expository...etc.) • Make a list of predictions you would like to confirm in the text • Make a list of what you do not know about the topic and you would like to learn from the text • Distinguish between your background knowledge and the new information found in the text • Check the text content against your predictions
Interpretive phase	Questioning and Inferring Strategies • Raise/form questions from headings and sub-headings • Predict the upcoming information • Keep questioning while reading • Infer the major ideas of the topic from titles or first sentences of each paragraph • Try to infer implicit information especially when it is crucial to your understanding Annotating Strategies

	• Mark the text through underlying and/or circling important words and information • Look up unfamiliar words/expressions and define them in your own words • Use your own words to paraphrase the author's ideas in the margins • Distinguish between main ideas and supporting ideas (identify topic sentence and supporting sentences) • Write notes and questions in the margins Analysing Strategies • Identify the organizational aspects of the text in terms of its typical structure (compare/contrast, cause/effect, division/classification, problem/solution, chronology/process analysis,...etc) • Critically analyse the logical link between ideas and visual aids (tables, graphs, diagrams...) • Critically analyse ideas to distinguish fact from opinion • Take notes while reading to understand and remember what you read • Outline author's presentation of information or argument • Summarize sections of interest
Evaluative phase	Self-regulation Strategies • Tolerate ambiguity and confusion in the 1st reading • Try to clarify ambiguities through re-reading and ongoing questioning or seek help from someone else (e.g. classmate, language teacher, or subject specialist teacher) • Be aware of what reading strategy fits what context • Try to explain or share what you have learnt with others Evaluating Strategies • Compare content to your own predictions (true/false) • Compare the text to other documents dealing with the same topic • Give your own interpretation of the author's ideas • Evaluate the author's arguments and evidence • Try to find knowledge gaps for further investigation/reading

Table 3.2: The three phases of the critical reading process

1. *The Planning Phase:*

This introductory phase implies the students to plan for the act of reading before actually practicing it. It is principally meant for indentifying the reading goal and objectives in order to heighten the students' motivational factors towards the reading practice. For doing so, planning strategies and schema-activation strategies are highly required in this phase.

a) *Planning strategies:*

These are a set of strategies that critical readers adopt before reading a document. These strategies help the readers to plan for the reading activity which may facilitate for them the reading process to benefit as much as possible from the material. This undoubtedly will entail an increase in the readers' motivation and interest towards reading; that is why these strategies are important. Relevant to this, after identifying a purpose for reading which can be revising for the exam, doing a test, learning about a new topic, or doing a research paper, previewing is considered as a fundamental strategy to check the document relevance to the students' purpose for reading before reading it. In other words, students should check: titles, subtitles, number of pages, organization of paragraphs, use of figures, pictures, tables, diagrams, charts, ...etc. In such a way, students are creating kind of an image about the document in their minds which is so important in facilitating the reading practice.

b) *Schema-activation strategies:*

Schema-activation strategies are also indispensible before starting reading a document. As mentioned earlier schemata (singular schema) are sets of knowledge and experiences that people use to interpret and make sense of newly learnt information. Schemata can be activated through brainstorming, predicting, questioning, etc. The practice of these strategies demand the students to be able to brainstorm/externalize ideas that they already know about the topic of a given text; use surface features and organizational clues to identify the genre of the text (descriptive, expository, ...etc); make a list of predictions that can be confirmed in the text; make a list of what the students do not know about the topic and want to learn from the text; and distinguish between background knowledge and the new information found in the text.

As such schema-activation is significant because it is strongly believed that before being involved in learning new information, it is essential to build background of students' previous knowledge and experiences. While doing so, students can increase their critical reading ability as they keep thinking and sharing ideas. Moreover, besides raising students' motivation towards

reading, this practice of linking previous knowledge to new information would help students understand and retrieve that information later on which is thought of as a focal point in accomplishing the reading activity as a process of building knowledge. It can also reduce students' anxiety and even confusion when confronted with new information.

2. *The Interpretive Phase:*

After activating prior knowledge about a given topic, students are now able to interpret the meaning of the document as it is conceived by its author. To attain the interpretive phase questioning and inferring are found the most significant strategies in order to grasp the meaning of the material.

a) *Questioning and making inferences:*

Questioning and inferencing are significant strategies to promote critical reading of scientific documents. They can be used before and most often while reading a text. Readers can raise/form questions from headings and subheadings, and make predictions about upcoming information in the passage. Moreover, an efficient critical reader should keep questioning throughout the whole reading process. Raising questions (about for example the author's purpose for writing or choice of words) while reading helps the readers gain deeper comprehension of the material they read. On the other hand, keeping questioning will enable the readers to infer major ideas from titles and the first sentence of each paragraph. Making inferences may also concern implicit information which is not clearly stated by the author. Therefore, questioning and inferencing strategies encourage readers to develop their ability to read between the lines which is a crucial aspect in the interpretive phase of critical reading and a primordial step towards reading beyond the lines which is the cornerstone of the critical/evaluative phase.

Furthermore, reading with questions in mind or self-questioning while reading enable the reader, apart from saving time, to:

- Find out how ideas relate (or not) to each other
- React intelligently about the structure of the text
- Think logically about the strength of the writer's argument
- Advance your ability of perception as a critical reader
- Remember the content and retrieve information after reading

Therefore, the critical reader has to be able to practice self-questioning while reading and has to learn how to ask the right questions as well. Here are some examples:

- Without reading the whole passage, just from the heading and sub-headings, try to ask yourself:
  - Are there any unfamiliar words/expressions?
  - What kind of information will be provided by the author?
- Formulate questions to identify key words
  - What are the key words (words which are repeated, in bold face/italics, unfamiliar, etc.) and how do they relate (or not) to each other?
- Predicting the author's arrangement of ideas
  - While reading the title and sub-titles ask yourself: How does the author arrange the ideas of the text? Why are the ideas arranged in such way? Does this arrangement facilitate understanding pieces of information?

On the other hand, the ability of making inferences or reading between the lines is a characteristic feature of critical readers. Inferences can be made about text structure, main and sub-ideas, implicit information/meanings, etc.

- *Determining text's structure*: Reading the first sentence or the thesis of the essay is a key to infer the structure of the text. For instance, if an author starts a text with "The process of wastewater treatment comprises three steps", it can be inferred that the author will present a discussion of three distinct procedures of wastewater treatment.
- *Finding the main idea of each paragraph*: Paragraphs are the building blocks of the text's structure. Thus, each paragraph ought to represent a new piece of information that is tightly connected to the thesis. This new information forms the main idea of the paragraph and can be inferred from the topic sentence which is generally the first sentence of the paragraph.
- *Uncovering implicit information*: finding implicit information means uncovering indirectly stated meanings. This can be done through first grasping the literal meaning of the text, considering the writer's choice of words and linking that to prior knowledge and experiences using careful reasoning.

b) *Annotating and analysing:*

Annotating and analysing strategies are also of paramount importance in this phase. In that an efficient interpretation of a text, it is believed, would not be possible without an effective interaction between the reader (the ESP student) and the text. Accordingly, while reading,

students are highly required to react constructively to the given text in different ways. For example, students are supposed to mark the text through underlying/circling important words and information; look up unfamiliar words and define them in their own words; analyse the logical link between ideas and visual aids (tables, graphs, ...etc); identify the organizational aspects of the text in terms of its structure (compare/contrast, cause/effect, ...etc); distinguish fact from opinion, etc.

In this vein, annotating can be viewed as a way or strategy of marking the most significant parts of a text to help understand the content and recall information after reading. In doing so, readers are supposed to respond actively in order to be able to comprehend the text. Moreover, annotating urges readers to notice unfamiliar words, differentiate main and supporting ideas, paraphrase author's ideas, and write notes and questions in the margins. This strategy of critical reading promotes concentration during reading, hence improvement of comprehension. Furthermore, annotating prepares readers for text analysis and synthesis of ideas that can be utilized later on in written tasks like summaries.

There are mainly two ways of annotation: graphic and written (Sybrowsky, 1995). Graphic and written annotations are more significant when used together. These annotating tools can be employed in critical reading as follows (adapted from ibid.):

- *Graphic:*
  - *Highlight passages*: Draw a bracket next to a passage to identify its importance
  - *Mark repetitions*: Circle or underline repetitions of keywords to show emphasis or central ideas
  - *Underline*: Underline only the most important phrases or quotations to emphasize statements of interest
  - *Symbols*: Place a graphic symbol next to other annotations to represent the relationship between words and ideas and to portray the meaning of your annotations.
- *Written:*
  - *Comments*: In the margins, make editorial comments, write down thoughts that the text inspired, and point out the structure of the argument.
  - *Cross reference*: Mark the page number of a similar passage or section that lends insights to another one.
  - *Index*: On a separate piece of paper, create an index of major themes or ideas in the text. Each time you mark something, write the page number down for an easy reference.

- *Sign post*: take note of the major divisions in the argument and summarize these main points in the margins. Also mark significant repetitions, recurring themes, etc.
- *Summarize*: write a brief summary of the article or chapter.
- *Write questions*: ask questions about the text or structure of the argument. Look for the author evidence validity and implications.

Besides the above tools, readers can also develop their own annotating ways or techniques. Moreover, each developed symbol should be used to refer to a certain meaning. However, while annotating, as emphasized by Sybrowsky (ibid) readers have to:

- Underline the right amount of information
- Develop consistent annotating style
- Annotate accurately

On the other hand, analysing generally means examination of the different elements that constitute something. As a component of the critical reading process, analysis of scientific texts is meant for the detailed scrutiny of the constituent elements of a given text in terms of structure and content in order to get a better understanding of it. In doing so, the critical reader is expected to constructively respond to the text's meaning through interpreting author's diction and organization of ideas, and find out how they interrelate with each other and with the reader's background knowledge as well. The most important analysis strategies the critical reader of a scientific text has to know are the following:

- Defining unfamiliar words in own style using contextual clues
- Paraphrasing author's ideas
- Distinguishing main ideas from sub-ideas
- Distinguishing fact from opinion
- Interpreting the link between ideas and visual aids
- Identifying organizational aspects of the text in terms of (comparison/contrast; cause/effect; problem/solution; etc)
- Summarizing sections of interest

Worth noting is that proceeding effectively throughout the interpretive phase should lead the critical reader to realize the importance of not only what is the meaning to be constructed from the material but also how that meaning is constructed. Therefore, when the material is supposed

to be well explained, understood and interpreted, the students can move on to the critical/evaluative phase.

3. *The Evaluative/Critical Phase:*

This phase implies the readers' evaluation of their way of reading through self-regulation strategies before evaluating the material read by means of evaluation strategies. In fact, self-regulating strategies are primordial in this phase as well as throughout the critical reading process.

a) *Self-regulation Strategies:*

Self-regulation refers to the ability to monitor or control one's actions, thoughts, and feelings during a given task, for example reading, in order to increase motivation towards achieving a predetermined goal. This ability is a typical characteristic of the critical reader, and it is highly appreciated in ESP context. In that, with self-regulation strategies, the ESP critical reader becomes able to control and regulate his/her comprehension process; hence, the ability to get the maximum benefits from the critical reading activity. Therefore, self-regulation strategies like: ambiguity and confusion tolerance in the first reading, rereading to avoid ambiguity, as well as awareness about which reading strategy fits which context, are highly required to promote and facilitate the critical reading process.

Based on Zimmerman's self-regulation strategies, Maftoon and Tasnimi (2014) designed some self-regulation reading tasks taking into consideration personal, behavioural, and environmental influences. These tasks have been adapted to Algerian ESP context to promote self-regulation strategies among ESP students as a focal point of the critical reading practice. These tasks are principally aimed to raise students' awareness of self-regulation techniques that might promote their critical reading strategies. Some examples of these tasks include: environmental structuring, dealing with ambiguities, seeking help (social assistance), memorizing new information, and self-evaluation.

b) *Evaluation Strategies:*

Evaluation is the most crucial part of the critical reading process. Now that the reader has a clear idea about the text thanks to the interpretive phase where different strategies were employed to clarify the meaning of the author's ideas, the critical reader should not stop at this stage because understanding a piece of writing is not the right way to accumulate knowledge

academically. Therefore, the newly learnt information from a given text has to be examined and evaluated against the previously acquired knowledge. This step in the critical reading process is the most significant as it helps the development of the readers' higher order thinking skills, and enables them to grow as intellectuals.

There are some strategies that the critical reader has to possess in order to be able to evaluate a text/document. These evaluation strategies include:

- Comparing text content to predictions
- Comparing texts on the same topic
- Interpreting author's ideas
- Evaluating author's arguments and evidence
- Finding knowledge gaps

It is worth noting that, despite being categorized under different phases, practically there is no clear cut between these strategies as most of them can occur or be used, though to varying degrees, in all the three phases. For instance, questioning strategies are predominant but not limited to the interpretive phase since they can be employed in the planning and evaluative phases. Moreover, monitoring and self-regulation strategies should be present throughout the critical reading process even principally they are mentioned in the evaluative phase. Consequently, it can be concluded that the three phases of the critical reading practice, though attributed different labels, are complementary to each other in a logical progressive way that encompass every possible aspect of the reading activity as a constructive process of building knowledge effectively and continuously. This would undoubtedly help the reader (the ESP student) not only to learn something new but even to grow as an intellect.

All in all, the questionnaire, in this study, is considered as the most significant research tool which is highly relied on in triangulating the other research instruments, namely the Critical Reading Test and students' Reflective Journals. In other words, the reliability of the students' questionnaire as a research instrument, and especially the information got through, can be validated by students' scores in the Critical Reading Test and reflections recorded in their journals.

III.2.3.3. Students' Reflective Journals:

Reflective journals, as it has already been mentioned, are means by which students keep records of their language learning experiences in the classroom. In these journals, students may

express their thoughts, feelings, and reactions towards a given learning experience; they can even write about their difficulties and successes during and after a learning practice. As posited by Gillis (2001, p. 49), journaling is "a method of promoting exploration and facilitating reflection on learning and new experiences within the context in which the learning unfolds" (in Dunlap, 2006, p. 25). Accordingly, it is strongly believed that the use of reflective journals as data collection tool gives a good opportunity for teachers/language researchers to discover the students' thoughts and reflections on their actual learning experiences.

Relevant to this, the present study used students' reflective journals as a third data collection instrument to triangulate the questionnaire and the Critical Reading Test. Not only that, these journals are also supposed to provide thoughtful insights into the students' thoughts, perceptions, and attitudes towards classroom experiences during and after the intervention, and that can supply valuable evidence to validate or negate the findings obtained from the other research instrument as well as confirm or refute the hypotheses stated at the beginning of the study.

To effectively proceed into the process of writing their reflective journals, students were prepared before being engaged in doing so. In that, the researcher gave some instructions that might explain and facilitate the way to keep a reflective journal. After explaining the notion of reflective journals to the students, as it was totally new for them, the students were informed about the purpose and the importance of journaling in helping them to understand and improve themselves as language learners in general and as critical readers in particular. Another purpose was to promote their critical reading strategy awareness and use while reading field-related material in English, which would undoubtedly assist them in overcoming their difficulties and increase their motivation towards the reading skill, hence the improvement of their academic achievements.

Furthermore, to avoid any sort of confusion about how to start, how to keep writing, or how to accomplish their journals, students were encouraged to complete a guided reflective journal by the end of each reading phase as well as by the end of the training program (the intervention). In fact, providing students cues or guided questions would "help them focus their journal responses" (ibid: 21). Moreover, preferring journaling at the end of each reading phase instead of weekly journaling was mainly because the latter, as confirmed by Dunlap, "can lead to burnouts, which diminishes the quantity and quality of students' journal responses" (ibid, p. 24)

In the guided reflective journaling, used in this study, participants were required to thoroughly document their responses to a set of journal questions. The latter were principally designed to trace students' critical reading development at different stages of the intervention. Other related variables were also considered, for instance: students' motivation towards lessons, encountered difficulties, changes in their critical reading ability as well as their suggestions and recommendations for contextual amelioration. Here are examples of questions students were required to respond to reflectively:

➢ Questions posed at the end of a reading phase:
- What have you learnt from this phase (planning phase/ interpretive phase/ evaluative phase)?
- How do you perceive the strategies learnt in this phase?
- What difficulties have you encountered during this phase?
- What do you expect to learn more?
- What do you suggest to improve the learning situation?

➢ Questions posed at the end of the intervention:
- How much did you know about critical reading strategies before the intervention?
- How do you perceive learning about critical reading strategies after the intervention? What do you like/dislike most?
- Do you feel any improvement in your way of reading field-related materials in English critically?
- Do you feel that you still have the same difficulties of understanding material in English after the intervention?
- What do you suggest to improve the whole course?

III.2.4. Procedures: Training ESP Students into Critical Reading Strategies

In this study, the experimental procedures were developed to test the impact of a critical reading strategies training instruction, designed by the researcher, on promoting critical reading strategies awareness and use among ESP students. This experimental design also seeks to find out the effectiveness of this training in enhancing students' motivation towards learning the English language in general and the reading skill in particular, comprehending field-related material in English, and increasing academic achievements. Moreover for the development of the critical reading strategies training instruction, the study relied on recent research about

metacognitive reading strategies (Mokhtari and Reichard, 2001; Mokhtari and Sheorey, 2002), and critical reading strategies in EFL (Larking, 2017).

The main objective of the experimental procedures, in this study, is to determine whether an explicit instruction in critical reading strategies would promote ESP students' critical reading strategies awareness and use while reading field-related materials in English, in order to overcome their reading difficulties, increase their motivation towards reading, ameliorate their comprehension-based reading as well as critical reading abilities, and develop their academic achievements. For doing so, a sample of 65 ESP students representing the Experimental Group received training in critical reading strategies by means of an explicit instruction, while the 45 students who represent the Control Group were not introduced to any aspect of the new instruction. Rather they received their English course following the traditional way; i.e. reading comprehension for literal meaning of the text or getting general information. As such, students in the Experimental Group were supposed to show a higher level of performance in critical reading strategies than their counterpart in the Control Group.

It is worth noting that these experimental procedures lasted over a period of a whole semester; the second semester of the academic year 2016-2017 (approximately 14 weeks). The researcher was the instructor of the Experimental Group, whereas for the Control Group there was another teacher so that treatment fidelity can be guaranteed. In that, the Control Group might be directly or indirectly exposed to experimental instruction if taught by the researcher. Therefore, to avoid the Control Group's exposure to any influences of the intervention, it was suggested to be taken in charge by another instructor. The latter, of course, was always in contact with the researcher to be informed about the necessary pedagogical procedures to follow with the Control Group.

Prior to the intervention both of the Experimental and the Control Groups were administered the Critical Reading Test and the Critical Reading Strategies Awareness Questionnaire in the same session. The participants were asked to do the test first and once they finished they could answer the questionnaire (the questionnaire was not given to the students until all the test papers were collected). Administering the test before the questionnaire was done on purpose so that to avoid any possible pretention from the part of the students that they already know about critical reading strategies. Moreover, as the questionnaire provides a lot of information about critical reading strategies, it can support the students in doing the test which might decrease the latter's reliability in supplying worth data about students' critical reading

strategies awareness. On the other hand, the students were allotted 30mn to do the test while the questionnaire took 20mn to be answered. Both research tools were administered during an ESP session for both groups.

After this pre-treatment phase, the researcher proceeded to the implementation of the intervention that was based on an explicit critical reading strategies instruction with the Experimental Group while keeping the traditional instructional procedures in teaching the Control Group by the other teacher.

Experimental Group:

As mentioned previously, the experimental group, in this study, received a critical reading strategies training package developed by the researcher to promote the participants' critical reading strategies awareness and use in ESP. The training took place once a week during the session of English course which lasted for one hour and a half. It is worth noting that these students have never received any training of any type to improve their English language or the reading skill; the fact which makes this study an unprecedented contribution in the ESP field in general and in Algeria in particular.

Before being effectively trained in critical reading strategies, the students were introduced first to the notions of critical reading, critical reading strategies, and even ESP that they have never heard about before. The researcher provided precise and concise definitions of the new concepts and showed their importance in the students' academic and professional career. It was remarkable from the beginning the high level of interest the students revealed especially when they were informed that they were going to be trained in how to read their specialized material in English critically. Moreover, the students' positive impression was mainly because as they said "it is the first time we will receive an English course of a high level". An English course that is different from the traditional courses which are usually based on grammar and reading comprehension; something the students got fed up with, particularly at the university where they often expect to learn new aspects of knowledge that should push their level forward and not backward. Furthermore, besides classroom explanation and discussion of the newly introduced notions that make the basis of the intervention, students were also given handouts to reinforce their knowledge and familiarity with the new concepts.

The key element of the training was that the students in the Experimental Group were made aware of the different efficient strategies that would enable them to read their field-related

documents with a critical eye instead of reading superficially. So that they could not only be cognizant of the necessary steps of the reading activity that would eliminate any sort of comprehension problems but even to get the maximum benefits in terms of language improvement and knowledge construction. Accordingly, it was hoped that critical reading strategies awareness and use would be promoted through teacher modelling and then providing students with opportunities to practice, monitor and reflect on their progress in using these strategies.

As it has previously indicated, the integration of critical reading strategies into ESP instruction, in this study, was based on effective classroom practices which are tightly linked to explicit strategy instruction. Along approximately 14 weeks of training, ESP students at the ENSH were made aware of what and how to use different strategies that pertain to the critical reading process. Students were explicitly taught the following critical reading strategies: Previewing, Schema-activation, Questioning, Inferring, Annotating, Analyzing, Self-regulation, and Evaluation strategies. Moreover, the instructional procedures of each training session were characterized by the steps that follow:

1. Activating students' prior knowledge by asking them whether they have ever heard about a given strategy or not and how do they perceive it.
2. After listening to students' responses, the teacher gives a clear identification of the strategy and how and when it can be used.
3. The teacher tries or models the strategy in front of the students through think aloud until they understand it.
4. The students are given the opportunity to practice/apply the strategy both individually and in group work.
5. The teacher passes, checks, corrects, facilitates, simplifies, and scaffolds...etc.
6. All the students should be given the possibility to participate and share their ideas even though not correct.
7. Mastery of strategy can be realized through practicing it with various readings both inside and outside the classroom.

Also important to be noted is that these procedures require as well reviewing previously learnt strategies before a new one is introduced. As for increasing students' interest and motivation, the teacher attempts to do the following:

1. Negotiate all aspects of the course with the students and encourage them to suggest addition of new items.

2. Integrating students in the selection of readings.

3. Divide the classroom into small groups of four students maximum and ask them to keep working together until the end of the semester.

4. Each small group should be assigned a research topic that has to be developed through the use of the acquired strategies and which has to be presented orally by the end of the semester.

5. Encourage students to evaluate the procedures and outcomes of each session as well as the whole course by means of reflective journals.

6. Encouraging classroom discussion,

7. Encouraging collaborative work

Control Group:

While the Experimental Group was being trained in critical reading strategies, the Control Group (45 participants) continued with traditional classroom instruction. The regular ESP classroom is mainly based on reading comprehension of some technical topics followed by exercises on vocabulary and grammar. Reading materials are generally retrieved from the web by the language teacher. During the class students are often required to silently read the text which has been selected by their teacher. After that, the teacher asks for volunteers to read the text loudly for the whole class. When loud reading is finished, the instruction proceeds to comprehension activities which are generally based on answering some reading comprehension questions like: what is the general idea of the text? What is the main idea of each paragraph? How many paragraphs are there in the text? ...etc. Such questions never seek negotiating what is beyond the literal meaning of the passage.

Vocabulary and grammar exercises are also given space in the traditional ESP course. Vocabulary exercises are usually about finding synonyms and opposites of some given words and expressions in the text. On the other hand, tenses are the focal point of grammar practice where students are often asked to give the correct forms of verbs between brackets. In case the instruction proceeds further, the teacher will require the students to summarize the text or write a paragraph about a given topic in the written expression section of the lesson.

Furthermore, the regular ESP classroom is teacher-centred. Students are not provided with any opportunity to discuss materials or instructions imposed by the teacher. Rather they are always recommended to follow directions and respond to their teacher's questions. Both native

language (Arabic) and/or first foreign language (French) are used in the classroom besides the target language (English). Accordingly, though the ESP course revolves around reading comprehension of technical topics, it has never been targeted towards developing students' comprehension-based reading strategies, let alone critical reading abilities.

Eventually, to fulfil the requirements of the present study, the same instructional conditions were kept with the Control Group. Thus, unlike the Experimental Group, the Control Group did not receive any instruction in critical reading strategies. However, the reading materials used with the Experimental Group were the same as those used with the Control Group. Put another way, the two groups were instructed differently and assigned different activities while dealing with the same field-related documents.

III.3. Data Analysis

After collecting the research data by means of various data collection tools as explained in the previous section, the next step is to analyze those data. According to Seliger and Shohamy (1989) data analysis revolves around "sifting, organizing, summarizing, and synthesizing the data so as to arrive at the results and conclusions of the research" (p. 201). As stated previously, the main purpose of this experimental study is to find out whether an explicit critical reading strategies instruction would positively impact ESP students' performance in post-critical reading test and as well as post-CRSAQ compared to pre-critical reading test and pre-CRSAQ. Adopting a mixed methods approach, the researcher seeks a more in-depth analysis and evidence for the treatment effect. In doing so, both qualitative and quantitative data were gathered to be later statistically analysed using the Statistical Package for Social Science, also known as SPSS (version 23). Yet, the qualitative data obtained from the students' reflective journals were treated through interpretation and descriptive analysis of the participants' reflections.

III.3.1. Pre- and Post-Critical Reading Tests:

As indicated earlier, this experimental research aims at determining the effect of critical reading strategies training through explicit instruction on ESP students' promotion of critical reading strategies awareness and use while dealing with field-related material. Accordingly, and in order to elicit the equivalence of performance in critical reading of the Experimental and Control Groups, an independent sample *t-test* was utilized. This t-test concerns the measurement of means difference between the two groups of the study. Therefore, before starting the critical reading strategies training (intervention) and after the administration of the critical reading test to

both groups, a t-test analysis was performed on the data collected from the first pre-test for the purpose of revealing whether a significant difference exists or does not between the Experimental and the Control Groups mainly in terms of the ability of reading specialized material critically. Relevant findings are shown in the next table.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CR Pre-test	Equal variances assumed	,503	,480	-,359	98	,721	-,19596	,54648	-1,28044	,88852
	Equal variances not assumed			-,360	95,457	,720	-,19596	,54428	-1,27643	,88451

Table 3.3.: Independent samples t-test for critical reading ability before the treatment

As noticed in table 3.3, the significance level (sig) of Levene's Test for Equality of Variances is 0,897 that is greater than 0,05, i.e. it exceeds the Alpha level. Accordingly, it can be concluded that group variances are similar. Moreover, it is marked in the column named *Sig*. (2-tailed) that the *p*-value of the test is 0,721. Since this value is larger than the level of significance 0,05, it can be assumed that there were no statistically significant differences between the Experience and Control Groups' critical reading ability in the pre-test. This would confirm that the two groups' critical reading abilities were equal prior to the introduction of the treatment which demonstrates the homogeneity of both groups.

However, after training the Experimental Group into critical reading strategies use, was there a statistically significant difference between the Experimental and Control Groups? To answer this question, another independent samples t-test was conducted on the data obtained from the post-critical reading test that was administrated to both groups after the intervention. The next table gives more insights.

		Levene's Test for Equality of Variances		t-test for Equality of Means							
										95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
CR Post-test	Equal variances assumed	,017	,897	5,083	98	,000	2,69899	,53102		1,64520	3,75278
	Equal variances not assumed			5,194	97,980	,000	2,69899	,51968		1,66770	3,73028

Table 3.4.: Independent samples t-test for critical reading ability after the treatment

Considering the results of the t-test exposed in the above output box, it is clear that the p-value is smaller than the significance level of alpha "0,05" (p=0,000). This means that there is statistically a significant difference in the critical reading performance of the groups under study. In other words, the findings indicate that the performance of the Experimental Group (which was trained in critical reading strategies use) was hugely different to that of the Control Group (which experienced the regular ESP course based on reading comprehension of technical texts). As such, it can be deduced that the critical reading strategies training suggested by this study has helped the participants in promoting their critical reading strategies use. To validate these results, the data obtained from the Experimental group pre-test were compared to those obtained by the same group in the post-test. Relevant to this, paired samples t-test was needed to be performed. The findings of the test are mentioned in table 3.5 below.

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	PretestEXP - PosttestEXP	-3,67273	3,19754	,43116	-4,53714	-2,80831	-8,518	54	,000

Table 3.5.: Paired samples t-test for the experimental group critical reading before and after the intervention

Considering the paired samples t-test, mainly the column of *Sig.* (2-tailed) for equal variances, it is obvious that the p-value is smaller than the significant level alpha "0,05" (p=0,000). This implies that statistically there is a significant difference between the pre-test and post-test means of the Experimental Group. This difference provides evidence to confirm that there was a development in the Experimental Group performance in critical reading post-test.

Consequently, it can be concluded that after the intervention, the Experimental Group participants realized an important enhancement of their critical reading abilities.

Paired samples t-test was also performed to know whether or not a significant difference exists between the pre- and post-test means of critical reading among the Control Group. Results are exposed in the next table.

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	PretestCONT - PosttestCONT	,04444	1,66454	,24814	-,45564	,54453	,179	44	,859

Table 3.6.: Paired samples t-test for the control group critical reading pre- and post-tests means

The table above indicates that the p-value equals 0,859 which is higher than the alpha level "0,05". As a consequence, the results obtained from the paired-samples t-test for the Control Group helps confirming the assumption that there will be no significant difference between the Control Group pre-test and post-test means in the critical reading test. Therefore, it can be deduced that there was no remarkable development in the Control Group participants' performance as far as their critical reading abilities are concerned.

On the other hand, as mentioned earlier, the critical reading test contains both comprehension-based and evaluative/critical reading questions. What was highly noticed, when correcting the answer sheets of the Experimental group was that the participants were able, after the training, to answer such questions like "Do you agree with the author's ideas? Justify your answer!" It was the first time that the students showed opposition to the author's ideas and gave their justifications for their own opinions. However, when it comes to the control group, the participants either avoid responding to a such kind of questions that need the ability to read critically and answer analytically, or diectly confirm their agreement with the author's ideas. As such, it can be concluded that the participants in the control group are still convinced that every thing written by authors is right and cannot be judged and/or disagree with. Therefore, it is clear that the experental group participants have remarkably improved their critical reading performance that can be construed in terms of their ability to answer evaluative questions of the critical reading test.

III.3.2. Pre- and Post- Critical Reading Strategies Awareness Questionnaire:

This questionnaire which was developed by the researcher aimed to measure the ESP students' critical reading strategies awareness before and after the treatment. It contains two sections. The first section intended to elicit background information about the participants in the two groups of the study through revealing their gender, age, years of studying English, as well as their level in this language. The same section also seeks information related to the participants' attitudes and motivation towards reading in English besides the difficulties they encountered while dealing with specialized material in English. This is to determine whether these factors will be affected either posively or negatively due to the critical reading training. On the other hand, the second section tries to detect the frequency of the respondents' reported use of critical reading strategies in both groups before and after the intervention. The data collected from the Experimental and control Groups are exposed respectively then compared in order to discern the outcomes of the treatment.

3.3.2.1. The Experimental Group Pre-CRSAQ Results:

The data obtained from the CRSAQ were treated by means of descriptive statistics. As for the first section of the questionnaire, the findings reveal that 62.3% of the participants were males and 47.8% were females. Their ages range between 19 and 22 years old. Moreover, the majority of the subjects (61.9%) have been studying English for 9 years, 56.7% have been studying it for 10 years, and the rest 44.4% for more than 10 years. As for the perception of their English level, most of the respondents 54.5% perceive their level in English as being fair, 15% perceive it poor, and only 10% of the participants view their level in English as being good. However, no one of the respondents does think of their level as excellent.

Furthermore, since motivation is considered as an important factor for the promotion of critical reading strategies, the first section also seeks data about the participants' attitudes and motivation towards reading in English. Relevant to this, the subjects were firstly asked whether they like studying English or not. The results showed that 90.9% of the participants confirmed that they like studying English, while 9.1% said that they do not like it. As for the importance of reading in English, 49.1% of the respondents perceive reading in English as very important, 43.6% regarded it as important, whereas the rest (7.3%) look at it as not important. In the same vein, the subjects were asked whether they think critical reading of scientific documents in English as necessary for them or not. Answers to this question unveil that 80% of the

respondents view critical reading of scientific documents as necessary, and only 20% perceive it as not necessary. Concerning the last question in this sub-section, which required the subjects to confer if they like, or do not like, their teacher to show them how to read critically, most of the responses (90.9%) said yes, and only 9.1% answered with no.

Students' reading difficulties are also given space in this section. Knowing about students' difficulties in reading would enable the researcher to elicit information concerning the obstacles that the participants might encounter during the intervention, so that to effectively manage how to deal with them, and then to find out whether the treatment was helpful in overcoming these difficulties or not. Accordingly, the subjects were first asked to mention whether they have difficulties in reading in English or not. Findings revealed that the majority of the participants 94.5% have reading difficulties. When asked to indicate which kind of difficulties they encounter while reading academic material in English (vocabulary, grammar, comprehension, analysis ...etc), most of the respondents (27.3%) selected analysis as the main difficulty they in their English reading, 21.8% mentioned comprehension, 18.2% found vocabulary as the most difficult aspect of reading, while grammar was considered as a reading obstacle by only 1.8% of the respondents. Yet, a significant percentage of the subjects 25.5% claimed that all the aspects mentioned above represent real handicap for them when reading in English, and just 5.5% said that none of the previous aspects create difficulty for them.
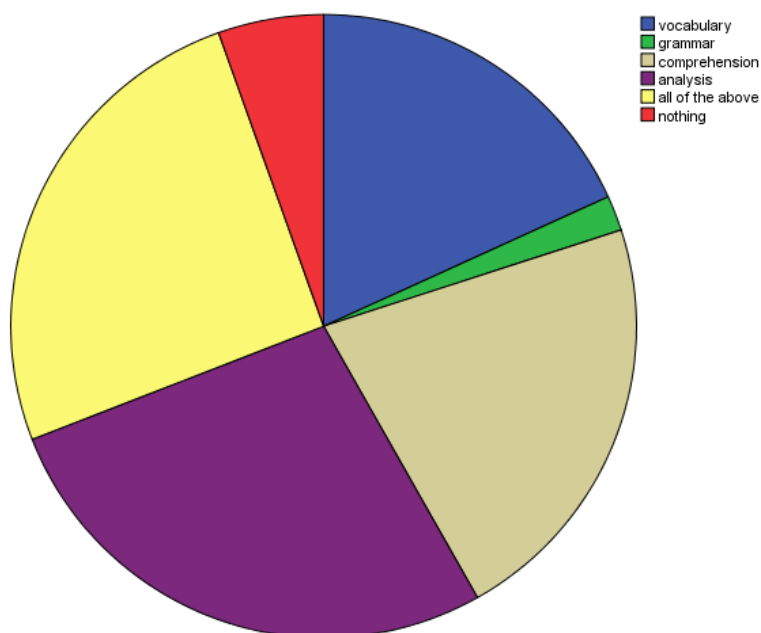
Figure 3.1.: Kind of difficulties encountered by experimental group before the intervention

The last question of the first section required the respondents to determine what they consider as the principle reason for their reading difficulties. They had to select between lack of reading, way of reading, both of them, or nothing. Treating answers to this question showed that the majority of the participants 45.5% viewed the way of reading as the main reason of their reading difficulties in English, 29.1% considered lack of reading as the principle reason, while 20% of the subjects refer their difficulties to both reasons. However, 5.5% did not choose any reason because for them reading in English is not difficult.

The second section of CRSAQ, as demonstrated earlier, investigates data related to the frequency of the participants' reported use of critical reading strategies while reading specialized academic material in English. This section contains 33 items and each item is followed by 3 numbers (1= I never do this; 2= I sometimes do this; and 3= I always do this). After reading each item, the respondents have to select the number which applies to them. Then, the data collected were analysed using descriptive statistics in order to detect the frequency of critical reading strategies use by the participants in terms of the three phases of critical reading, namely: planning, interpretive, and evaluative phase, separately, besides the overall use of all strategies of the three phases conjointly. Relevant to this, the overall average of critical reading strategies, the frequency of each phase, as well as the mean scores of the seven categories of critical reading strategies in each phase, as reported by the Experimental group before the intervention, were calculated and displayed in what follows.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium	33	50,8	50,8	50,8
	low	32	49,2	49,2	100,0
	Total	65	100,0	100,0	

Table 3.7.: The experimental group overall use of CRS before the intervention

Table 3.7 above shows the overall average of critical reading strategies used by the experimental group participants when reading academic documents in English. As it can obviously be remarked the majority of the participants present a medium level of critical reading strategies use with the frequency of 50.8%. In addition, 49.2% of the respondents reveal a low level of critical reading strategy utilization, while no one of the participants can be described as a higher user of critical reading strategies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Phase1	23	35,4	35,4	35,4
	Phase2	33	50,8	50,8	86,2
	Phase3	9	13,8	13,8	100,0
	Total	65	100,0	100,0	

Table 3.8.: The experimental group reported use of CRS by phase before the intervention

Data related to the frequency of the students' reported use of critical reading strategies by phase in the experimental group is presented in table 8. Accordingly, the interpretive phase strategies (phase2) are evidently the most deployed reading strategies among the experimental group participants (50.8%). Then, the utilization of the planning phase strategies (phase1) was reported to be 35.4%. Finally, the evaluative phase strategies represented 13.8% only, to be as such the least employed phase of the critical reading process by the respondents in the experimental group before the intervention.

Furthermore, the mean scores of the seven categories of critical reading strategies separately were also calculated. As exposed in table 9 below, analysis strategies (AnS), which belong to the interpretive phase, marked the highest score (1.57) following the participants responses before the intervention. In the same phase, questioning and inferring strategies (QIS) and annotating strategies (AS) got a similar score (1.47). This score is a little bit less than schema-activation strategies (the planning phase) mean score which equals 1.48. After that, planning strategies scored 1.41. Also remarkable was that the evaluative phase strategies, namely self-regulation strategies and evaluation strategies were reported as having the least mean scores of about 1.39 and 1.28, respectively. The representation of all these results is clearly illustrated in table 9 hereinafter.

		PS	SAS	QIS	AS	AnS	SRS	ES
N	Valid	65	65	65	65	65	65	65
	Missing	0	0	0	0	0	0	0
Mean		1,4154	1,4846	1,4708	1,4769	1,5795	1,3962	1,2892

Table 3.9.: Mean scores of the experimental group reported use of CRS by category before the intervention

III.3.2.2. The Control Group Pre-CRSAQ Results:

The control group consists of 55.4% females and 44.6% males whose ages ranged between 19 and 22 years old. In addition, most of the participants in the control group (38.8%) had been studying English for 9 years, 28.9% had been studying it for 10 years, and 33.3% claimed that

they had been studying English for more than 10 years. As for the perception of their English level is conerned, findings revealed that like the experimental group, the majority of the control group respondents perceived their English level as fair (51.1%), 24.4% perceived their lavel as being good, and 22.2% regarded it as poor; whereas the remaining 2.2% considered their level as excellent.

Additionally, answers to the questions that pertain to the sub-question of motivation also presented varied percentages. Collecting data about their attitude towards studying English, results unveiled that 97.8% like studying English while 2.2% did not. As for the importance of the reading skill in English, 64.4% of the respondents answered very important, 33.3% said that it is important, whereas 2.2% thought of it as not important. Furthermore, the participants' views regarding their perception of critical reading of scientific documents in English as necessary for them or not. Responses to this question showed that 88.9% believed in that reading scientific documents in English critically as necessary, while 11.1% of the particiants was not necessary for them. Moreover, answers to the last question in this sub-section asked the subjecs to say whether they like or not their teacher of English to instruct them in how to read critically. Findings indicated that the majority 95.6% were for, and only 4.4% were against.

The control group respondents were aso asked questions about their difficulties when reading academic material in English. Interest in the control group reading difficulties was primarily due to the researcher's belief that unlike the experimental group which was expected to overcome their reading difficulties after the intervention, the control group would reveal the same difficulties since it was not trained in how to read critically. Relevant to this, the first question inquires about whether the respondents have or do not have difficulties in reading in English. Answers to this inquiry showed that the majority (93.3%) said that they had reading difficulties, and 6.7% confirmed that they did not have difficulties. Regarding the kind of difficulties they encountered while reading in English, most of the respondents 51.1% claimed having analysis difficulties, 2.2% said they had vocabulary difficulties, 15.6% suffered grammar difficulties, 17.8% had difficulties with comprehension, 6.7% indicated all the previously mentioned aspects as reading difficulties, whereas 6.7% confirmed that they had no difficulties in reading in English.
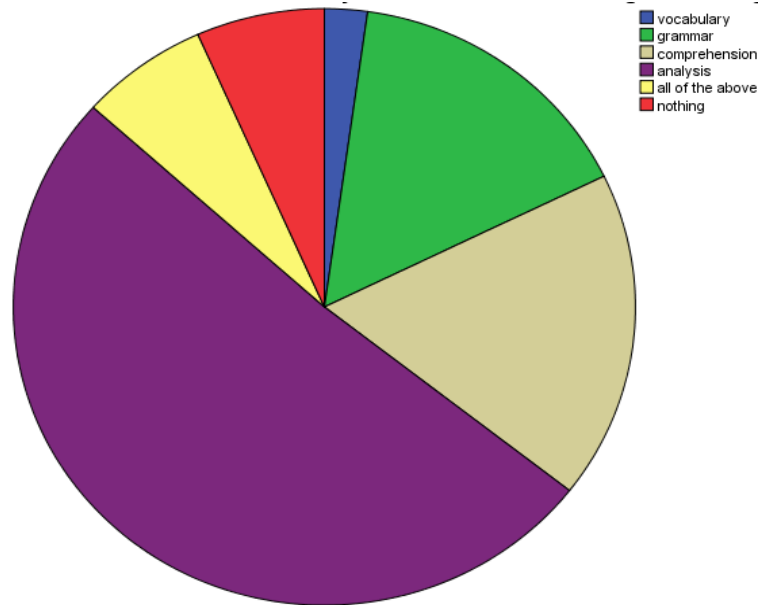
Figure 3.2.: Kind of Difficulties Encountered by Control Group before the Intervention

Finally, the control group participants were required to mention whether their reading difficulties were due to the lack of reading, their way of reading, or both of them. Answers to this inquiry demonstrated that 28.9% considered their reading difficulties were mainly because of their way of reading, a minority 4.4% referred their difficulties to lack of reading. On the other hand, the majority 60% viewed both their way of reading as well as lack of reading as the principle reasons for their reading difficulties in English, whereas 6.7% did not choose any item as they believe that they did not encounter difficulties while reading in English.

Furthermore, like the experimental group, the control group participants were also required to respond to the second section of the CRSAQ. This is to elicit information about the frequency of critical reading strategies use among the students in the control group before the intervention. Data gathered from this section were also analysed by means of descriptive statistics. The latter was mainly used to evaluate the participants' reported use of critical reading strategies in terms of overall use, use by phase, as well as use by category. The mean scores of the participants' strategy use when reading academic material critically were also calculated. In what follows, findings are shown with details.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium	28	62,2	62,2	62,2
	low	17	37,8	37,8	100,0
	Total	45	100,0	100,0	

Table 3.10.: The control group overall use of CRS before the treatment

Findings concerning the overall average of the control group's reported use of critical reading strategies before the treatment are presented in the above table. As it can be noticed most of the respondents 62.2% revealed a medium level of deploying critical reading strategies while reading academic material in English. Moreover, 37.8% of the participants presented a low level in terms of critical reading strategies use. However, no one of the participants was detected as having a high level of using critical reading strategies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Phase1	12	26,7	26,7	26,7
	Phase2	28	62,2	62,2	88,9
	Phase3	5	11,1	11,1	100,0
	Total	45	100,0	100,0	

Table 3.11.: The control group reported use of CRS by phase before the treatment

Table 11 reveals the frequency of the control group reported use of critical reading strategies by phase before the treatment. Relevant to this, as it is clearly demonstrated in the table, the second phase (interpretive phase) got the highest frequency of use by the participants with the percentage of 62.2%. In addition, the first phase (planning phase) represents 26.7% of the whole use of critical reading strategies by the control group. Nevertheless, the third phase (evaluative phase) is remarked as the least used (11.1%) among the respondents of the control group before the treatment.

For more details about the control group reported use of critical reading strategies before the intervention, the mean scores of the seven categories of critical reading strategies as used by the participants were also evaluated. Data gathered in this vein are analysed and mentioned in table 3.12 below.

		PS	SAS	QIS	AS	AnS	SRS	ES
N	Valid	45	45	45	45	45	45	45
	Missing	0	0	0	0	0	0	0
Mean		1,3111	1,3407	1,4933	1,4000	1,4556	1,7167	1,3556

Table 3.12: The control group reported use of CRS by category before the treatment

Reading the results in the above table, it is obvious that self-regulation strategies (SRS) marked the highest mean score (=1.71) among the other categories of critical reading strategies. Then, questioning and inferring strategies (QIS) come in second place with a mean score which equals 1.49. After that, analysis strategies (AS) scored 1.45, followed by annotating strategies

with a mean score of 1.40. Next, the remaining categories: evaluation strategies, schema-activation strategies, and planning strategies were reported the least employed strategies representing approximately similar scores that equal 1.35, 1.34, and 1.31, respectively.

III.3.2.3. The Experimental Group Post-CRSAQ Results:

After the treatment, the same CRSAQ was administred to the experimental group. Accordingly, background information about this group subjects did not differ from data already collected from the Pre-CRSAQ. However, their English level, motivation, and difficulties might have changed after the intervention. In this regard, answers to the question dealing with the participants English level revealed that 58.2% perceived their level in English as good, 38.2% said it was fair, and only 3.6% viewed it as poor.

On the other hand, findings reported that 98.2% said that they like studying English, whereas only 1.8% said no. Moreover, answers to the question about the importance of reading in English indicated that 85.5% considered it as very important, 14.5% regarded it as important, while no one perceived it as not important. Additionally, data about the necessity of reading scientific documents critically demonstrated that the majority of the participants (98.2%) responded with yes, whereas the remaining minority said no (1.8%). The same thing with the last question, regarding motivation, which asked the participants whether they like their teacher to show them how to read critically or not, most of the respondents 98.2% answered yes, and only 1.8% answered with no.

With reference to the experimetal group reading difficulties after the treatment, results showed that the majority 98.2% claimed that they did not have difficulties, and 1.8% reported that they had difficulties. In terms of the kind of difficulties they encounter while reading in English, 41.8% of the subjects confirmed that they did not have any kind of difficulties, 25.5% referred their difficulties to vocabulary. Furthermore, grammar and comprehension difficuties were mentioned by 16.4% and 14.5% of the respondents respectively, while 1.8% selected the answer of all kinds of difficulties. However, analysis alone was not chosen by any one as a kind of reading difficulty.
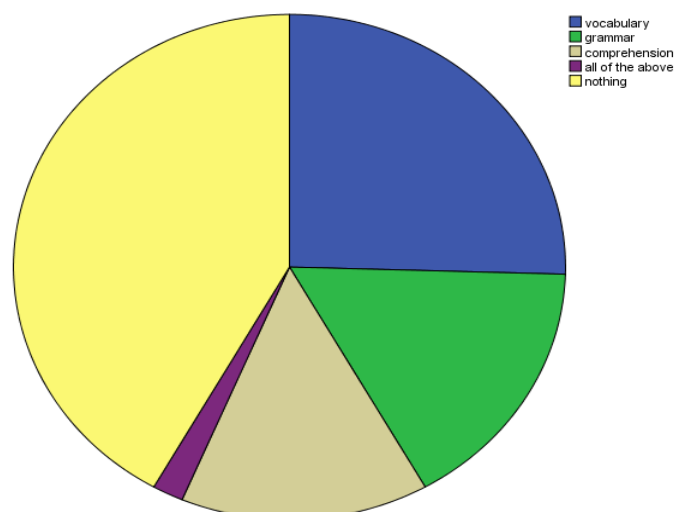
Figure 3.3.: Kind of difficulties encountered by experimental group after the intervention

As for the main reason behind the previous difficulties, the majority 56.4% selected lack of reading, 1.8% opted for way of reading, and the rest 41.8% said no reason.

On the other hand, the second section of CRSAQ supplied data about the experimental group reported use of critical reading strategies after the treatment. Like the pre-CRSAQ, data collected in this section were also analysed by means of descriptive statistics. Accordingly, the participants' overall use of critical reading strategies, then by phase (planning, interpretive, and evaluative), and last by category of reading strategies were calculated. In other words, overall average as well as the mean scores of critical reading strategies as reported by the subjects of the experiment after the intervention were statistically treated then exposed in the next tables.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high	40	72,7	72,7	72,7
	medium	13	23,6	23,6	96,4
	low	2	3,6	3,6	100,0
	Total	55	100,0	100,0	

Table 3.13.: The experimental group overall use of CRS after the treatment

The table above displays findings concerning the experimental group overall use of critical reading strategies after the treatment. As it can be read, the majority (72.7%) of the participants demonstrated a high level of deploying critical reading strategies while reading specialized material in English. Then, 23.6% of the respondents reported medium level of the same strategies use, whereas the remaining 3.6% revealed a low level of strategy use when reading critically.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Phase1	18	32,7	32,7	32,7
	Phase2	8	14,5	14,5	47,3
	Phase3	29	52,7	52,7	100,0
	Total	55	100,0	100,0	

Table 3.14.: The experimental group reported use of CRS by phase after treatment

Results regarding the experimental group reported use of critical reading strategies by phase after the treatment are exposed in table 14. Examining these results, it was quite evident the third phase of the critical reading process, namely the evaluative/critical phase, attained the highest percentage in terms of use (52.7%). After that, the first phase (planning phase) was reported to be used by 32.7% of the participants. Finally, the second phase (interpretive phase) represented 14.5% of the whole average use of critical reading strategies by the experimental group after the intervention.

	PS	SAS	QIS	AS	AnS	SRS	ES
Mean	2,5636	2,4485	2,4218	2,2691	2,4970	2,5455	2,5564
N	55	55	55	55	55	55	55
Std. Deviation	,44153	,47669	,55999	,50217	,48484	,55505	,61064

Table 3.15.: The mean scores of the experimental group reported use of CRS by category after the treatment

Table 15 represents the mean scores of the experimental group reported use of CRS by category after the treatment. Findings in this table indicate that the highest mean scores were marked by planning, evaluation, and self-regulation strategies with means of 2.56, 2.55, and 2.54, respectively. Then, analysis strategies attained the mean score of 2.49, followed by schema-activation strategies with a score of 2.44. After that, the mean score of questioning and inferring strategies reached 2.42. Finally, annotation strategies got the least mean score which equals 2.26.

III.3.2.4. The Control Group Post-CRSAQ Results:

The post-CRSAQ was also administred to the control group that did not reveive any intervention. According to data collected, background information concerning participants in this group were similar to those recorded in the pre-CRSAQ. With reference to their level in English language, the majority of the participants (42.2%) claimed that it was fair, 33.3% viewed it as good, 22.2% perceived it as poor, and only 2.2% regarded it as excellent. When asked whether they like studying English or not, most of the participants (66.7%) answered with yes and 33.3%

responded with no. The question which deals with the importance of reading in English reveived the following responses: very important 17.8%, important 46.7%, and not important 35.6%. Once again, the participants in the control group were asked whether they consider critical reading of scientific documents in English as necessary or not. Most of the respondents said yes (88.9%), whereas the rest 11.1% said no. The majority (95.6%) also confirmed their preference to be taught how to read critically, while 4.4% answered with no.

As far as reading difficulties are concerned, 93.3% confirmed having difficulties while reading in English, and 6.7% denied this. Moreover, when asked about the kind of these difficulties, the majority (66.7%) selected analysis, 17.8% mentioned conprehension, 4.4% opted for grammar, 2.2% of the participants indicated vocabulary difficulties, and the same percentage goes for those who suffered from all the previously mentioned difficulties. However, 6.7% claimed having no difficulties when reading in English.
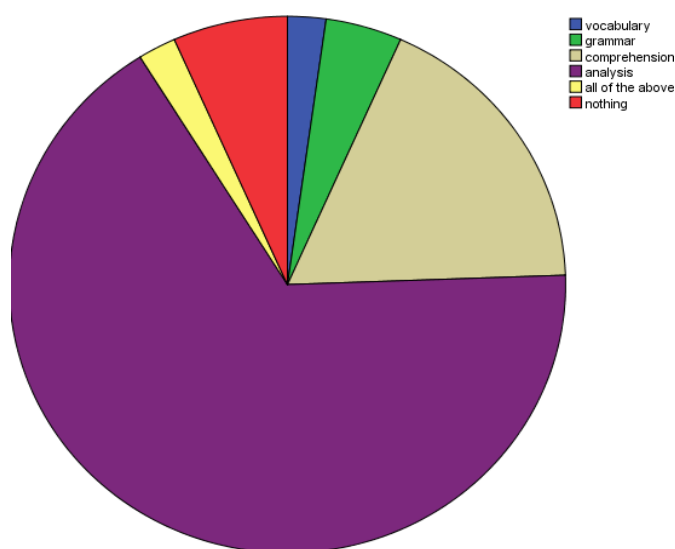
Figure 3.4.: The kind of reading difficulties encountred by the control group after the intervention

For what they consider as the main reason for their reading difficulties, 64.4% selected the way of reading, 4.4% said it was due to lack of reading, 24.4% opted for both reasons (way and lack of reading), whereas 6.7% reported nothing.

On the other hand, data pertinent to the second section of post-CRSAQ were also categorized and organized, then statistically described and analysed in terms of the participants reported use of critical reading strategies while reading academic material in English within the speciality of hydraulics. Particularly, emphasis was made on calculating the freqency of overall

use of critical reading strategies, then the respondents reported use of these strategies by phase as well as by category. Results are displayed in the coming tables.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium	34	75,6	75,6	75,6
	low	11	24,4	24,4	100,0
	Total	45	100,0	100,0	

Table 3.16.: The control group overall use of CRS after the intervention

Table 16 presents the overall use of critical reading strategies among the control group participants after the treatment. Accordingly, it can be read that the majority of the respondents 75.6% revealed a medium level of critical reading strategies use, and 24.4% showed a low level, whereas no one of the participants was described as a higher use of these strategies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Phase1	15	33,3	33,3	33,3
	Phase2	23	51,1	51,1	84,4
	Phase3	7	15,6	15,6	100,0
	Total	45	100,0	100,0	

Table 3.17.: The control group reported use of CRS by phase after the treatment

Findings concerning the control group reported use of CRS by phase after the treatment are exposed in table 17. With reference to this table, it is obvious that the strategies of phase2 (interpretive phase) were the most used (51.1%) among the participants of the control group after the treatment. After that, phase1 (planning phase) marked 33.3%, and finally the third phase (evaluative phase) came last with the percentage of 15.6%.

	PS	SAS	QIS	AS	AnS	SRS	ES
Mean	1,5333	1,5148	1,6222	1,5333	1,5630	1,7667	1,3556
N	45	45	45	45	45	45	45
Std. Deviation	,40452	,27483	,34436	,32193	,25198	,35516	,21696

Table 3.18.: The mean scores of CRS use by category among the control group after the treatment

Table 18 represents the mean scores of the critical reading strategies use by category as reported by the control group participants after the treatment. Relevant to this, it is so clear that self-regulation strategies (SRS) scored the highest mean which equals 1.76. Next, questioning

and inferring strategies (QIS) came in second place with a score of 1.62. After that, analysis strategies (AnS) attained the mean score of 1.56. For annotating (AS) and planning strategies (PS) the same mean score was marked (1.53). Not so far, schema-activation strategies (SAS) reported the score of 1.51. Eventually, evaluation strategies (ES) scored the least mean which is 1.35.

After the descriptive analysis of critical reading strategies use by the two groups before and after the intervention, paired samples as well as independent samples t-tests were conducted. This is to calculate the mean scores of critical reading strategies overall use among the respondents of both groups before and after the treatment. The main purpose of this test, as stated earlier, was to find out whether the explicit instruction in critical reading strategies has had an impact on the experimental group critical reading strategies use or not. Findings of these tests are provided below.

		Paired Differences							
				Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation		Lower	Upper			
Pair 1	PreCRS - PostCRS	-,05154	,14241	,02123	-,09433	-,00876	-2,428	44	,019

Table 3.19.: Paired samples t-test for pre- and post-CRS overall use by the control group

With reference to the results displayed in table 19, it is clear that the p-value (sig. 2tailed) which equals 0.019 is greater than the significance level of alpha (=0.05). Therefore, it is evident that there was no statistically significant difference between the pre- and post-test means of the control group. In other words, the participants in the control group did not reveal any amelioration in terms of critical reading strategies use and this is due to the fact that this group pursued the English course in the traditional way that was based on reading technical topics without any focus on any reading strategies.

		Paired Differences							
				Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation		Lower	Upper			
Pair 1	PreCRS - PostCRS	-,97964	,53361	,07195	-1,12390	-,83539	-13,615	54	,000

Table 3.20.: Paired Samples t-test for Pre- and Post-CRS Overall use by the Experimental Group

The findings in table 20 reveal that the p-value (sig.2tailed) is equivalent to 0.000, that is smaller than the significance level of alpha (=0.05). This means that there exists a statistically significant difference between the pre- and post- means of the experimental group participants in what concerns the overall use of critical reading strategies. Accordingly, it can be assumed that the students in the experimental group achieved a significant improvement in terms of employing critical reading strategies while reading specialized material in English and this is after being trained explicitly in these strategies.

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Overall	Equal variances assumed	5,210	,025	1,761	98	,081	,05482	,03114	-,00697	,11662
	Equal variances not assumed			1,854	88,070	,067	,05482	,02956	-,00393	,11357

Table 3.21.: Independent Samples t-test of CRS Overall Use by both Groups before Intervention

As revealed in table 21 above, the p value (sig. 2-tailed) equals 0.081 which is higher than 0.05. This implies that before the treatment there were statistically no significant differences between the experimental and control groups' participants mainly in terms of using critical reading strategies. In other words, prior to the treatment both groups showed the same level of critical reading strategies awareness and use.

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Overall	Equal variances assumed	28,809	,000	13,686	98	,000	,91901	,06715	,78575	1,05227
	Equal variances not assumed			14,892	65,585	,000	,91901	,06171	,79578	1,04224

Table 3.22: Independent Samples t-test of CRS Overall Use by both Groups after Intervention

According to table 21, the results show that the p-value (sig.2-tailed) is 0.000, which means that it is smaller than the significance level of alpha (=0.05). This indicates that there is statistically significant difference between the post-CRSAQ means of the experimental and the control group students regarding the use of critical reading strategies after the treatment with the experimental group. Relevant to this, it can be assumed that the explicit instruction in critical reading strategies has had a positive impact on the experimental group students' use of these

strategies which is not the case with the control group participants who pursued their English course in the usual way focusing mainly on reading comprehension of technical texts.

III.2.3. Reflective Journals:

Students' reflective journals were used as the third research instrument to triangulate findings attained from the critical reading test and the CRSAQ. After being thoroughly introduced to the notion of reflective journals and how to be used in language learning, students in the experimental group were required to record their perceptions, difficulties, expectations, among others during and after the training process into critical reading strategies. For not being lost or confused, the students were guided through a set of questions so that to be able to ponder smoothly, easily, and effectively on their critical reading strategies learning experiences. These questions were asked after each phase of the critical reading process (planning, interpretive, and evaluative) and then by the end of the intervention.

Relevant to this, the questions asked after each critical reading phase dealt with what have been learnt by the students and how they perceived the strategies taught to them in each phase. The questions also concerned the difficulties encountered by the participants during each phase as well as their expectations about what to lean more. The last question required the students to provide their own suggestions in order to improve the learning situation. However, at the end of the intervention, students were asked about their background knowledge on critical reading strategies prior to the treatment. They were also questioned about their perceptions of being instructed in critical reading strategies. After that, the students were asked whether they felt any improvement in their way of reading field-related material in English critically, and whether they felt they still had the same difficulties of understanding material in English after the intervention. Finally, students were required to give suggestions to ameliorate the whole course of English.

III.3.3.1. Reflections on the Planning Phase:

The planning phase, as already stated, makes the first step in the critical reading process, hence the first phase for the experimental group participants to be trained in. In this phase students were explicitly taught how to plan for reading a material critically. In addition, this phase contains planning strategies and schema-activation strategies. Planning strategies are based on identifying a purpose for reading to increase one's motivation towards reading, and previewing to check the document's relevance to the reader's reading purpose. However, schema-activation strategies concern mainly the activation of prior knowledge about the topic

through brainstorming, predicting, questioning, etc. All these steps of the planning phase should occur before reading a document critically.

After being trained in the above pre-reading strategies, students were required to reflect on what they have learnt both in terms of content and process. As expected, through their reflections students were able to remember what they have been trained in during the planning phase. According to their responses, students confirmed the importance of this phase which enabled them to discover something new that they have never heard before. As put forward by one student "I used to read directly, but now I learned that I have to plan for my reading". Another student added "what I learned was very important. I must set up a purpose before I start reading any document". Another example stated that "the first step of reading is to have a purpose for reading".

On the other hand, students have also expressed their thoughts concerning schema-activation strategies. Predicting and brainstorming background knowledge about a given topic before reading about it was found not only beneficial but even amazing by students. For them these strategies facilitated the reading activity and reduce confusion, especially when meeting a new topic. In this vein, one student said "I like brainstorming because it makes me learn and enjoy reading at the same time". Another student claimed that "schema-activation strategies like predicting and brainstorming helped me learn how to make reading motivating and easy".

For the perception of the strategies learnt in this phase, students expressed highly positive attitudes as well as increased motivation towards these strategies. The latter, according to them, make the reading process more organized. Not only this, but even long texts that seemed difficult to deal with before, have become easier for the students after being trained in how to use these strategies. Moreover, for those who used to hate reading have changed their attitude as claimed by this student "I always hated reading in English because it was difficult and boring for me. Now, I can read with confidence and I like to read". Similarly, another student expressed his perception of the planning strategies in this way "planning strategies are significant and necessary because they helped me to plan my reading in English even long texts".

On the other hand, students were also given the opportunity to reflect on the planning phase in terms of the difficulties they encountered along this phase. Most students mentioned the use of new vocabulary as the pertinent difficulty since for them it was not easy for them to remember all the new words presented in this phase. The second problem was that of practice. The majority of the participants thought that these strategies need a long time and more concentration for

practice. The latter was also handicapped by the factor of time which, according to them, was not enough to do all the strategies. For this, the teacher explained to the students that they should practice at home because classroom practice is always limited by time.

Finally, the students were requested to express their expectations on what to learn more as well as their suggestions to improve the learning situation. All the students asked for learning more strategies that would enable them to easily read technical texts in their field-study. Some suggested to spend extra time on students' classroom practice and to avoid homework because they were overloaded with their specialty modules duties. Others preferred the concentration on more communication activities. Of course these expectations and suggestions were all taken into consideration in the coming phases.

III.3.3.2. Reflections on the Interpretive Phase:

After the planning phase, the experimental group participants were introduced to the interpretive phase of the critical reading process. This phase revolves around understanding the meaning of the text or document as it is conceived by its author. To achieve this, students were trained into comprehension-base strategies which include: questioning and inferring strategies, annotating, and analysing strategies. By the end of this phase, students were also given a chance to reflect on what they have learnt during this phase. They were as well asked to express their difficulties and provide their expectations and suggestions to improve the interpretive phase learning situation

Similar to the planning phase, the interpretive phase was also appreciated by the students. For them, this phase has enabled them to learn various strategies that helped sharpening their comprehension abilities. Thanks to these strategies, students became able to define difficult words using contextual clues. They also acquired how to paraphrase author's ideas, distinguish main idea from supporting ideas, and differentiate fact from opinion. Additionally, interpreting the link between ideas and visual aids, identifying organizational aspects of texts in terms of comparison/contrast, cause/effect, ...etc, and summarizing sections of interest were also effective strategies that have been given space in the interpretive phase. All these aspects were effectively learnt and positively perceived by the majority of the participants. As expressed by one student "we studied different types of texts, how to differentiate between main ideas and supporting ideas, and how to summarize a text... As an advantage, I can say that I have acquired new notions and the methodology was good".

As for the difficulties encountered by the students during this phase, students once again mentioned their problems with new vocabulary. For this, one of them asked for the use of Arabic to translate "hard words". Others complained about going fast throughout lessons and requested the teacher to proceed slowly. Difficulties of practice were again demonstrated in this phase. In that some students said it was difficult to remember and practice all the strategies. However, others thought that the teacher had to explain and model the strategy several times before giving the opportunity to the students.

With regard to the students' expectations and suggestions, there was not something new. In other words, the same suggestions mentioned in the planning phase were repeated in this phase, especially the focus on more classroom practice. Practicing activities orally was also highlighted in the students' suggestions, besides encouraging team work and collaboration among the students and between the students and the teacher. Nevertheless, all the students liked the way the course was proceeding and wanted to keep studying lessons of the same level.

III.2.3.3. Reflections on the Evaluative/Critical Phase:

The last step in the critical reading process was the evaluative/critical phase which was the most crucial part of the critical reading activity. In that it implies the readers' self-evaluation before evaluating the reading material. Accordingly, self-regulation strategies and evaluation strategies make the basis of this phase. Once accomplishing this phase, students were expected to reveal an ability of evaluating their own way of reading through efficient management of learnt strategies. Then, the ability of evaluating and criticising the author's ideas from different perspectives which can be achieved through comparing and interpreting author's ideas, evaluating author's arguments and evidence, as well as finding knowledge gaps. When reaching the ability of using these strategies, a reader can be said to become a critical reader.

In fact, these strategies made the most difficult part of the critical reading process for the experimental group. As preconceived by most, if not all, of the students, anything written by authors is right and should not be judged or otherwise denied. This preconception has often created a kind of barrier in front of the students' competences to develop as critical readers. A very simple example of this case can be justified by the students' "yes" response. Whenever asked this question "Do you agree with the author's ideas?" all the answers come in "yes", and the question is followed up by justify your answer if "no", there would never be an effective justification of the "no" answer. Relevant to this, this phase as a whole is still considered

difficult by the students even after training. As put forward by a student "we learned critical reading, but we still have difficulties in evaluation strategies".

Concomitantly, the students' expectations and suggestions were expressed with reference to the above difficulties. As such, it was suggested to repeat the evaluation phase as a whole giving more importance to the most difficult strategies. Once again, and like in the previous phases, practice makes the focal point accentuated by students in this phase. For this, student said "we must practice more to learn these strategies better". On the other hand, some participants suggested dealing with topics in fields other than hydraulics. For example one student claimed that "the only negative thing was that we were limited only in our domain, everything was about hydraulics". These suggestions were undoubtedly taken seriously by the researcher for the amelioration of the course.

III.2.3.4. Reflections on the whole Course after Treatment:

By the end of the second semester of the academic year 2016-2017, and after approximately 14 sessions of treatment, the explicit instruction into critical reading strategies among ESP students at the ENSH came to its end. Along this treatment, these students were made aware of critical reading strategies and how to use them to read field-related materials in English. The focus was mainly on three phases that constitute the critical reading process, namely: the planning phase, the interpretive phase, and the evaluative/critical phase. At the end of each of these phases, students were required to ponder on what they learnt and record their difficulties, perceptions, expectations and suggestions for each phase in their reflective journals. Not only this, students were even asked to reflect on the whole treatment through responding to the following aspects:

1- Students' knowledge about critical reading strategies prior to the intervention;
2- Their perception of learning about critical reading strategies after the intervention;
3- Their feelings about any improvement in their critical reading strategies awareness and use;
4- Their ability to overcome reading difficulties after the intervention; and
5- Their suggestions to improve the whole course.

Students' responses to these items reflected their appreciation and high motivation towards the proposed instruction. For the first question which inquires about their knowledge about critical reading strategies before the treatment, students confirmed their ignorance of these strategies. For them, reading a scientific text is just for getting the general idea through reading

comprehension. However, few students claimed that they used to practice some strategies but unconsciously. In this vein, a student stated "I used to do some steps (of critical reading) without knowing about them".

The students have also expressed their perception of the critical reading strategies learning process as well as their improvement in this regard. The majority of the students were satisfied with the proposed content and the way it was presented to them. In other words, teaching critical reading strategies explicitly was highly supported by the students. As noted by them, the strategies were helpful and so interesting. Some examples of the students' perception of these strategies are mentioned next:

Student1: "we studied critical reading and its techniques which were so helpful and interesting. Probably, the most important thing I have learnt is not to accept entirely an author's opinion in whatever literature I read. Also, we learnt about those clever strategies we use to extract information we need (analysing, annotating, evaluating...)"

Student2: "we have studied how to read with a critical eye, how to preview a document, to be honest, I liked the method, and the way of studying"

Student3: "we studied to become able to able to define terminology related to hydraulics, and the most was to read, analyse, evaluate and extract what is important from a text, a book ...etc. We have seen different examples.

Student4: "Well, the English program was so good and rich, especially in our domain (hydraulics). We learnt how to process exciting texts and new"

In addition to their positive perception of learning about critical reading strategies, the students confessed that this was so helpful to improve in their English language level. For them, learning about these strategies supplied them with new notions and rich vocabulary. It was also beneficial for them as they became able to analyse different types of texts and summarize main ideas. Moreover, the most significant amelioration was the development of the students' competence of reading technical texts critically. Some of the student's reflections on how this instruction aided them to improve are shown below:

Student1: "... I really benefited from my English lessons. For me, the major benefit was to know how to get what I need from a text (or research publications) and detect its main ideas by only having a quick look into it."

Student2: It was a good experience. We learned a lot of things like: previewing, predicting, analysing, summarizing, and evaluating. Now, I use them when I read articles."

Student3: "In my first year I was unable to talk, write and even read hard words until it comes this English class where I learned the most important thing and I still remember it because I use it even in holidays."

Student4: "During the last semester, we had the chance to learn new and effective methods that would allow us to better understand, digest and judge scientific papers in a shorter time and that in order to use time more wisely. We also studied techniques of critical reading like previewing and drawing graphic organizers, and other interesting techniques."

On the other side, there were two students who thought that the course did not help them to improve sufficiently. In that, they still had difficulties, as they claimed, when reading texts in English. According to these students, the intervention did not assist them to develop their critical reading abilities. For instance, one of these students claimed that "I have often dreamt of improving my English but I couldn't. I don't know if it was because of the program or because of lack of desire". The other student reported that "We learned critical reading but I still have difficulties in the English language". Otherwise, the remaining participants expressed their satisfaction with the treatment that supported them a lot in ameliorating their way of reading scientific documents critically, as well as in overcoming their difficulties in understanding different types of texts as mentioned previously.

Eventually, students have also referred to their expectations and provided some suggestions concerning what they want to learn more and how to improve the course. In such a way, some of the students suggested to keep studying in what they described as "this high level", whereas others proposed to learn more techniques and information. Others found it important that after critical reading they should move on to improve writing and oral skills. Examples of students' expectations and suggestions are shown hereinafter:

Student1: "We studied critical reading and we hope to continue in the same level".

Student2: "Now, I wish to study how to write in English using technical words".

Student3: "I want to learn more vocabulary in the technical field"

Student4: "I expect more techniques and information".

Student5: "I expect to learn techniques of public speaking and expressing myself as I believe that would remarkably help me in my career as an engineer"

On the other hand, it is worth noting that even though they were not trainers in reflective journaling, participants in the control group were also required to give their opinion concerning their English course that was conducted in the traditional way that was based on reading comprehension of technical topics. As presumed, these students were totally dissatisfied with what they have studied. In that, and according to them, their English course was only a repetition of what they studied in the previous years of secondary school mainly. As such, the traditional course of English did not bring anything new to these students. To illustrate some of the participants' responses are cited next:

Student1: "... so that we were not satisfied for the last semester because there was nothing as new to know. Types of sentences, punctuation, how to write a paragraph ..., it was like a simple revision nothing more. ... I wish to learn something new, to communicate for example, and to develop our language."

Student2: "We studied clauses and types of sentences, but I see that's not enough because we need to know how to define our domain in English and we must communicate in English."

Student3: "Actually, we didn't learn something new. We have done types of sentences, punctuation, types of paragraphs. I didn't like the English class for the last semester because it was boring."

Furthermore, these students were expecting to learn more significant aspects that should respond to their level as future engineers. As claimed by one of them "we should learn all the notions of hydraulics, understand and analyse hydraulic topics." Another student confirmed that they need "lessons and work that can ameliorate our abilities to understand while reading and enrich our vocabulary." In fact, all these comments and opinions highlight the deficiency and non-convergence of the traditional English course with what ESP students at the ENSH need and expect to learn as engineers.

III.4. Discussion:

Based on triangulation, both quantitative and qualitative data were collected then analysed in order to find out the impact of explicit critical reading strategies instruction on ESP students' critical reading strategies awareness and use. Relevant to this, after data analysis, it is

compulsory to interpret and discuss research findings for the sake of verifying and validating or refuting the hypotheses stated at the beginning of the research. For doing so, there was a need to compare results obtained before the intervention from both the experimental and the control groups, along the treatment process with the experimental group, and then comparing the results of the experimental group after the treatment with those of the control group. Of course, discussion of the findings focused principally on the main variables of the study, namely: students' critical reading strategies awareness and use, motivation towards reading, reading difficulties, and achievements.

3.4.1. The Experimental and the Control Groups before the Intervention:

Before starting the critical reading strategies training, the homogeneity of the experimental and the control groups in terms of their critical reading strategies awareness and use was validated by both pre-tests used prior to the intervention. In that, the findings of the pre-critical reading test confirmed that there were no differences between the participants' critical reading ability in the experimental and the control groups. In other words, the two groups' critical reading strategies performance was similar prior to the proposed treatment. Similarly, the results of the second pre-test (CRSAQ) also proved the homogeneity of the groups concerned with this study, especially in terms of critical reading strategies awareness and use, among other factors.

After analysing the first section of the questionnaire which deals with the participants' background information, motivation, and reading difficulties, the results revealed that the two groups were homogenous to a great extent. In both groups the participants were males and females whose ages ranged between 19 and 22 years old and that most of them had been studying English for 9 or 10 years. Moreover, the majority in both groups perceived their level of English as being fair.

As far as the aspect of motivation is concerned, findings confirmed that prior to the treatment participants showed high level of motivation towards learning the English language as the majority said that they like studying English. Furthermore, most of the students in both groups viewed the reading skill in English as very important and supported the significance of reading scientific documents critically. Additionally, the majority in the two groups approved the idea of being instructed in how to read field-related material critically.

With reference to reading difficulties, findings showed that both groups of the study suffered reading difficulties before the intervention. These difficulties pertain, especially, to

analysis of scientific texts, vocabulary, grammar and comprehension. Participants in both groups also confirmed that these difficulties were due to two important factors, precisely: lack of reading and their way of reading these texts.

On the other hand, the second section of the questionnaire which evaluated the participants reported use of critical reading strategies in terms of overall use, use by phase as well as by category, has also supplied homogenous results. In that, findings indicated that both groups reported a medium level of critical reading strategies use while reading academic material in English, and no one in both groups was detected having a high level on using these strategies. Likewise, results regarding critical reading strategies by phase, demonstrated that participants of both groups tended to make use of the interpretive phase strategies more than the planning and the evaluative phases. Nevertheless, there was a difference between the two groups in terms of critical reading strategies use by category. Relevant to this, while the experimental group attained high scores in using analysis strategies, the control group scored better in employing self-regulation strategies. This was the only distinguishing aspect of the experimental group from the control group before the treatment.

Eventually, as the results of the pre-critical reading test and the pre-CRSAQ indicated, it can be deduced that before the explicit instruction in critical reading strategies with the experimental group, students in both groups presented similar performance to a great extent, revealing a medium level of critical reading strategies awareness and use, high level of motivation towards reading in English, besides the difficulties they claimed to suffer from while reading specialized material in English. This implies that both groups represent the same population (ESP students at the ENSH) which would increase the validity of the study.

3.4.2. The Experimental Group along the Critical Reading Training:

Tracing the impact of critical reading strategies training with the experimental group was mainly detected through the subjects' reflective journals, wherein students' perceptions, difficulties, expectations and suggestions were recorded after each critical reading phase as well as at the end of the whole training course, and then triangulated by the results of the other research tools (the critical reading test and CRSAQ). In fact, at the beginning of the intervention, and while introducing the notions of critical reading and critical reading strategies, the students were totally confused as they did not expect to receive the English course in a new way other than the traditional one focusing on grammar and superficial comprehension of technical texts. And perhaps what increased the students' uncertainty about the new instruction was their

misconception of reading texts critically. For them, the verb to criticize has often denoted only the negative meaning of demonstrating the bad sides of something or even blaming someone for doing something. On the other hand, these students have a strong belief that everything written by authors has to be taken as a truth that should not be denied or judged. When told that as university students, they have to read with a critical eye, they were totally confused until they were informed that they are going to be instructed in how to do so through critical reading strategies.

Consequently, there was a need to introduce and discuss critical reading strategies with the experimental group through defining and explaining related concepts and even presenting some example international universities wherein critical reading development of their students makes the primary concern of the authorities. This introductory phase helped a lot in reducing the participants' confusion on the one hand, and on the other hand, it increased their interest in the training which was obvious through the questions they raised to know every single detail about the new instruction. Not only this, students were even hasty to move on to the practice of critical reading strategies. However, to trace the evolution of the students' performance throughout the process of critical reading practice, they were required to reflect on what they have learnt and record their ideas in their reflective journals at the end of each critical reading phase and then at the end of the whole course.

In fact, students' reflections provided thoughtful insights about how they were proceeding through their critical reading training, especially in terms of their perceptions, motivation, difficulties, expectations, and suggestions. According to what was recorded, the students positively perceived the course which they depicted as "of a high level". They appreciated the fact that they were made aware of critical reading strategies which were mandatory for them as university students. They also liked the way they were encouraged to not only learn these strategies but also to put them into effect while reading inside and outside the classroom. In addition, the participants highly appreciated the idea that even as students, they can read and critique everything written by authors for the sake of building knowledge and develop as intellectuals. Even the way of processing critical reading strategies through planning, interpreting, and evaluating phases, was so significant and helpful for them to understand, learn and remember these strategies. As such, it can be assumed that these positive perceptions reflect the students' increasing motivation and interest towards the instruction.

However, it has to be noted that promoting critical reading strategies created a real challenge for the students at the beginning of the training. In that, the majority confronted difficulties, especially when it comes to practice. Here, the students though that applying these strategies takes a lot of time, and that remembering and practicing all of them was not an easy task. For that the teacher, explained that it is a question of regular and continuous practice until these strategies became part of the students' reading habit and then develop into reading skills when they are used unconsciously but wisely. Moreover, evaluative strategies make the most difficult step of the critical reading process for those students who still not able to convince themselves that they can criticize and judge authors' ideas. For this, there students were advised to read regularly and extensively to accumulate knowledge that allow them to evaluate and compare authors' arguments.

In fact, the real development in the students' critical reading strategies performance was not was at the end of the whole course wherein the impact of treatment was so obvious. There was a clear difference between students' reflections along and at the end of the intervention. Now, the students are felt more matured more aware of what and how to use critical reading strategies. Great satisfaction with the course and its components: content and methodology, was also expressed by the students in their final reflections. This, in fact, emanates from students' high motivation towards pursuing the course and reflects at the same time their ability in overcoming most of the reading difficulties they used to suffer from before and sometimes during the intervention. These findings were further confirmed by the results obtained from the post-critical reading test as well as the CRSAQ wherein students' scores were higher than those got in the pre-tests. Based on this evidence, it can be deduced that the proposed explicit instruction into critical reading strategies has promoted ESP students' critical reading strategies awareness and use. To further validate this assumption, it was necessary to compare the results attained with the experimental group with those of the control group after the intervention.

3.4.3. The Impact of the Critical Reading Strategies Training on ESP Students: the Experimental and the Control Groups after the Intervention:

The findings obtained after the intervention provided decisive evidence that the explicit critical reading strategies training was the main reason behind the promotion of the experimental students critical reading strategies awareness and use which was confirmed as they outperformed the control group in the post-tests. Furthermore, triangulating the results supplied by the three

research instruments deployed in this investigation helped to affirm the effectiveness of the explicit instruction in critical reading strategies among ESP students.

As corroborated previously, statistical of the two groups' pre-tests means confirmed their homogeneity which signifies that before conducting the treatment, the participants in both groups revealed the same level of critical reading capacities. However, after the intervention with the experimental group, a comparison of both groups' post-tests mean scores demonstrated that the participants' means in the experimental group were higher than those of the control group. In other words, the experimental group performed better than the control group in the post-critical reading test and the CRSAQ. Therefore, it can be said that students in the experimental group have developed their critical reading strategies awareness and use. It is also worth noting that the experimental participants exceeded those in the control not only in the overall use of these strategies but also at the level of the three phases of the critical reading process (planning, interpretive, and evaluative phase). Even at the level of use by category of strategies (planning, schema-activation, questioning and inferring, annotating, analysing, self-regulating, and evaluating strategies) the experimental group worked better than their counterpart.

Furthermore, it is also necessary to prove that the promotion of the experimental group students' critical reading strategies was due to the treatment and that it did not happen by chance. For this, inferential statistics were conducted by means of paired sample t-tests taking into consideration the pre- and post-tests of both groups. The results revealed that there was statistically significant difference between the pre- and post-tests of the experimental group's mean scores. These findings can be sustained by the students' thoughts and feelings expressed through their reflective journals wherein they confirmed that there was an improvement in their critical reading ability. They even validated the assumption that the instruction helped them increase their critical reading strategies awareness and use. Moreover, since these students claimed that they have never met these strategies before and that the development happened after the treatment so it is logical to confirm that these students were able to promote their critical reading strategies thanks to the new instruction and not to chance. This instruction raised ESP students' awareness of the notion of critical reading and its various components. It also explained to them critical reading strategies and how they can be deployed in order to be able to read scientific documents, mainly in the field of hydraulics, efficiently and thoroughly.

On the other hand, the instruction has also influenced the participants' motivation, reading difficulties, and even achievement. In that, though they revealed high motivation and interest in

the course from the beginning, the participants kept this spirit of motivation and enthusiasm throughout the whole course. The same thing can be said for the students' difficulties in reading. Before the intervention, several reading difficulties were creating certain obstacles for understanding scientific texts, mainly in terms of analysis, vocabulary, and comprehension, among others. Along the intervention, it was remarked that the students' reading difficulties were regularly regressing until by the end of the instruction the students' became capable to overcome most of these difficulties as they declared in their reflective journals and as it was obvious through their performance in the post-tests. This would undoubtedly help, and to a great extent, the students' progress in their academic achievement as far as the English course is concerned. Such findings, in fact, are convergent with several studies in the same field (Mokhtari and Sheorey, 2002; Larking, 2017).

Eventually, it can be said that instructing ESP students into critical reading strategies explicitly was amazing and fruitful. In fact, at the beginning, this instruction represented a kind of challenge for the students and even for the teacher because it was something new and unprecedented with no guaranteed results. However, when the course proceeded, many problems and difficulties were surpassed and tension was lessened through the creation of a supportive learning environment wherein student-teacher and student-student collaboration and cooperation were highly encouraged both in individual and team work. Moreover the teacher's modelling of the strategies before giving the opportunity to students' practice was also an amazing experience that enhanced and sharpened the students' learning abilities. In the same way, the teacher's help, guidance and feedback increased the participants' motivation to keep following and ameliorating their performance along the learning process.

To conclude, the explicit instruction in critical reading strategies among ESP students at the ENSH was a successful experience that has promoted the students' critical reading strategies awareness and use. Thanks to this instruction, these students became able to read specialized material in English critically through planning, previewing, predicting, questioning and inferring, annotating, analysing, self-regulating, and evaluating strategies. The instruction has as well contributed in raising the students' motivation towards studying the English language in general and the reading skill in particular. It was also possible, due to this instruction, that ESP students became capable to solve their reading problems and get rid of their several difficulties they used to suffer from while reading in English. Pertinent to this, it can be concluded that integrating critical reading strategies into ESP instruction proved to have a positive effect on promoting these students' awareness and use of critical reading strategies, meanwhile it is highly

recommended to be widely introduced in other ESP contexts as it effectively enhanced students' motivation and significantly supported them overcome their reading difficulties, hence empowering them as critical readers of their scientific document and boosting their academic achievement.

Conclusion:

This chapter consisted in presenting the study context, and explaining the research methodology, data analysis procedures, as well as the results interpretation and discussion. Relevant to this, an overview concerning ESP teaching/learning at the ENSH was given. Then, it proceeded to a thorough explanation of the mixed methods research design adopted in this study, besides the presentation of the study participants, and the research instruments used for data collection. The chapter, then, moved onto the discussion of the data analysis procedures which were based on descriptive and inferential statistics using the SPSS programme version23. Interpretation and discussion of results was the last element tackled in this chapter wherein the research findings before, along, and after the intervention were analysed and interpreted with reference to the research questions set at the beginning of the study.

Accordingly, the findings of this research uncovered that, training ESP students into critical reading strategies yielded valuable outcomes as it resulted in raising the students' awareness and use of critical reading strategies while reading field-related material in English, which entailed an increase in their motivation, ability to overcome reading difficulties, besides becoming empowered as critical readers. Moreover, being integrated in such experience, the students were able to understand the different steps of the critical reading process that should start with planning, followed by interpreting, and ended with evaluating the reading material. The students also learnt that as critical readers, they have to master the following strategies: previewing, predicting, questioning and inferring, annotating, analysing, self-regulating, and evaluation. However, what matters most is that these strategies should go beyond the classroom instruction and teacher's support. They have to become part of the students learning habits. For this to be achieved, integrating critical reading strategies into ESP instruction has to be taken seriously by all the stakeholders in the ESP field through effective planning, institutional support, besides teachers and students collaboration as demonstrated in the chapter that follows.

Chapter Four

Suggestions

and

Recommendations

Introduction:

The present research has just proved that promoting ESP students' critical reading strategies is possible through integrating critical reading activities in ESP instruction and training students in how and when to use critical reading strategies, particularly while reading academic and specialized material in English. The research has also validated the assumption that critical reading strategies training among ESP students can enhance their motivation towards reading and help them overcome the difficulties they used to encounter during their reading of documents written in English language, which may entail as well the development of these students' academic achievements not only as language learners but even as critical readers. Nevertheless, enhancing ESP students' critical reading strategies is not an easy task since it is subject to enough time and continuous practice coupled with a gradual shift of guidance from the part of the teacher in order to render these strategies unconscious habits of the ESP student's reading practice.

Regarding what has been stated above, this last chapter suggests rethinking ESP teaching in Algerian context as the first step towards promoting critical reading strategies among Algerian ESP students. For doing so, it is highly recommended to re-enhance the Algerian ESP project, and to determine goals and objectives of teaching ESP to cope with 21st century Higher Education. In the same vein, national and international university collaboration, besides pre-service and in-service teachers' training are also found of paramount importance and worth consideration in this respect. Pedagogically, with reference to the study implications, some recommendations are put forward to be mainly addressed to all ESP stakeholders in Algeria, namely: administrators, teachers, and students.

IV.1. Rethinking ESP Teaching in the Algerian Context:

With reference to what has been mentioned in the theoretical part, it is clear that the subject of ESP teaching in Algeria is not well handled by stakeholders. In fact, the Algerian higher education authorities have been always interested in integrating the teaching of English in its institutions to meet the growing need of this language for university students' successful achievement in their fields of study. However, this initiative is still facing different obstacles which handicapped the progress of ESP teaching as a national project; the fact which urges the need for rethinking ESP teaching/learning in the Algerian context from various perspectives. In this vein, it is suggested to re-enhance the Algerian ESP project that would undoubtedly fulfil the requirement of a national university level ESP course. Furthermore, there is an urgent call for

determining the goals and objectives of ESP teaching to cope with the 21st century higher education exigencies. In addition, pre-service and in-service teachers' training has to be seriously taken into consideration and then supported by national and international university collaboration. For how this can be achieved, more details are provided next.

IV.1.1. Re-enhancing the Algerian ESP Project:

A positive step towards reinforcing ESP teaching/learning in Algerian universities was the inauguration of the Algerian ESP project. As mentioned in the first chapter, according to Osman Bencherif[25], this project was established in 1987 when some British universities accepted to collaborate with Algerian ones through signing individual agreements with the Algerian Ministry of Higher Education and Scientific Research. This collaboration was mainly addressed to help Algerian students, pursuing magister and doctoral studies in the field of science and technology, to study in the British universities concerned by this convention. Concomitantly, the British council supported the set up of three ESP centres in Algiers, Oran, and Constantine. These centres were principally targeted towards educational and scientific development, ensuring beneficial partnership and integration, besides fostering cultural understanding and enhancing literacy skills, as well as preparing learners as world citizens.

In fact, despite its enormous significance the Algerian ESP project has not been put into effect. In that, until now, there have been no fruitful results or effective achievements as far as ESP teaching/learning is concerned. Considering the real context, the English taught to university students in the science and technology field is still under-estimated and facing serious challenges and difficulties. For instance there has always been a remarkable absence of reliable resources that can be used by teachers to prepare their courses. Then, teachers who are in charge of this course are not trained in ESP, and the majority are part-time teachers. Moreover, the situation is worsened by a totally vague vision of integrating the ESP course in the Algerian university, which entails the absence of clear goals and achievable objectives that respond to 21st century higher education prospects. Consequently, this situation would result in spending time and money on something vague and without outcome. In other words, time is allotted for the course and teachers are paid for their work, but students are still struggling with their low level in the English language. They are still suffering in dealing with their specialized field documents written in English. They are still not satisfied with what is given to them in the English language session.

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[25] Osman Bencherif was the national coordinator of the Algerian Universities ESP Project (see chapter 1)

Taking into consideration what has been explained previously, it is highly recommended to seriously re-enhance the Algerian ESP project. Policy makers in general, and those concerned with higher education in particular are immediately called to handle the issue of ESP with great interest and focus attention. Conventions between Algerian and foreign universities (not only British ones) should not be limited to some words confessed and signed but could never come true into reality. Meanwhile, British universities are not the only ones that Algerian universities can collaborate with. Choosing other foreign universities, especially where English is taught as a foreign language, mainly in the field of science and technology, would undoubtedly be a good experience to compare and share ideas and expertise of different contexts involved in the same issue.

On the other hand, the Algerian ESP project should concentrate more on giving ESP teachers the chance to be formed in foreign universities instead of thinking about offering the opportunity to post-graduate students, in the scientific domains, to enrol in those universities for the sake of improving their English language. Forming ESP teachers instead of the students would be less costing and less time consuming. In that, as those teachers are already graduated in EFL, they will need less time to sharpen their skills as ESP teachers, hence less money would spent on their training. Furthermore, it is widely known that most, if not all, of the students, particularly, in the scientific fields, once given the opportunity to go abroad, they would never think to come back again to their country. This would render the Algerian ESP project a waste of time for national higher education institutions rather than a profitable project for the whole country. Thus, it is also suggested that the process of re-enhancing this project should be done with minute revisions and cautious decisions that have to be beneficial rather than destructive.

Nevertheless, this project should not be limited to fostering international university collaboration only. Rather, it should primarily take into consideration national requirements and circumstances. Relevant to this, the first step of the project has to do with diagnosing local ESP needs through conducting surveys or any kind of research that could yield valuable data and results in terms of ESP teaching/learning needs, wants, and lacks in the Algerian context wherein not only the students who are the focal point, but even teachers and the environment of teaching as well. Once these needs, wants, and lacks are identified, the next step to put forward has to revolve around how to fulfil the need for a national university ESP course as will be revealed in the following section.

IV.1.2. The Need for a National University Level ESP Course:

Designing effective courses is one of the significant steps that efficiently contribute to guarantee a successful teaching/learning process in any field of study including ESP. For this, the development of a national university level ESP course has become an inevitable need for the case of Algerian higher education institutions. Furthermore, well designed ESP courses could enable students and teachers to enhance their participation in the progress of scientific research through conferences, publication of articles and book chapters ...etc. However, despite realizing the fact that giving more interest to the improvement of ESP teaching/learning would enhance their status academically and professionally, Algerian higher institutions still far away from being competent to give the ESP issue its deserved value, especially in terms of course design. In fact, one of the serious problems facing Algerian teachers concerned with ESP is the enduring absence of a national curriculum that can be used as a reference for developing their syllabi and preparing their lessons. Consequently, it is highly recommended to urgently consider the need for a national university level ESP course.

A national university level ESP course can help Algerian higher institutions to cope with worldwide educational and scientific developments. It is obvious nowadays that the mastery of English language can increase, and to a great extent, the students' opportunity to get a valuable job nationally and internationally since English has become the first international language of science, business, computer literacy, aviation, politics, and even tourism. This fact has led to fundamental changes in international educational policies, among which the creation of the European Higher Education Area thanks to the Bologna process[26]. The latter has introduced a globalized educational system reform that is based on mobility, employability, lifelong learning as well as critical literacy. Indeed, the establishment of the European Higher Education Area, as put forward by Galyna et al. "sets challenging tasks in terms of greater mobility for students, more effective international communication, better access to information and deeper mutual understanding" (2005, p: 28). Therefore, to be able to benefit from this mobility and study abroad, students have to reveal a good level of English that only a well designed ESP course can provide.

Moreover, a national university level ESP course is recommended as it will supply students with the required competences, strategies and skills that can sustain them to perform efficiently in the learning process and then in the different occupational situations they may be involved in.

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[26] For more details see chapter2 p: 88

In other words, the national ESP course designed for university students, and called for here, should cater for not only the development of the learner's linguistic proficiency, in terms of grammar and vocabulary, but even for enhancing their critical literacy strategies like critical reading and thinking, besides the development of their communicative competence that would facilitate their mobility and increase their chance to integrate easily within various field of interests academically and professionally.

It is also suggested that the national university level ESP course should be a standardized flexible document. The latter ought to provide ESP practitioners with progressive characteristic aspects that can support them pedagogically especially in designing ESP syllabi which pertain to particular students' needs in a particular context and within predetermined circumstances. This course has the possibility to be implemented integrating required adaptations that should take into consideration the specific interests of higher institutions and their students simultaneously. In such way, the ESP course has to be always open for serious revisions for the sake of ameliorating its aspects based on current theoretical developments and experience of application.

In addition to what has been mentioned already, it is worth noting that the national university level ESP course has to respond to international changes as well as the growing needs of university students through diverse discipline areas. For doing so, Benabdallah suggested the development of a flexible and integrated ESP framework that should be based on strategic planning wherein all stakeholders' full commitment, involvement, and collaboration are highly required as shown in the figure below:
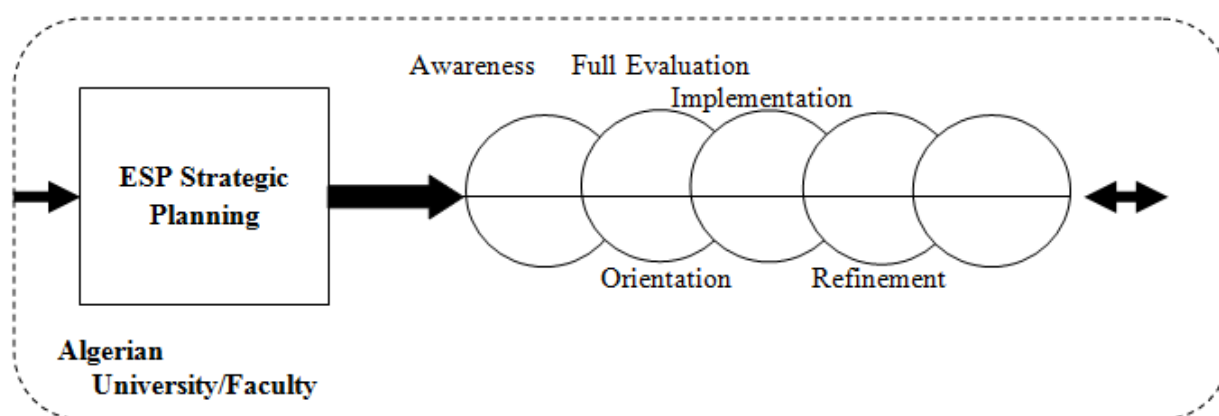
Figure 4.1.: ESP Strategic Planning (Benabdallah, 2019, p. 35)

As figure 4.1 shows, Benabdallah's ESP framework underpins five stages that can be explained as follows:

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1. *Awareness*: at this stage both ESP teachers and faculty members have to be conscious about what and how to teach their students with reference to their needs and well defined purposes of learning English.

2. *Orientation*: this stage implies the collaboration of part-time and full-time ESP teachers to reflect and decide on who teaches what, and which strategies and instruments to be employed based on the students' needs.

3. *Full implementation*: according to Benabdallah, this stage requires time as it is focused on strengthening ongoing communication between teachers and administrators. This also implies having a clear view on the students' abilities, weaknesses, besides their real needs, paying attention to neglected aspects like the group size, timing, and the time allotted to the English course.

4. *Refinement*: this concerns the decision-making team that has to be always aware about the new and more effective ways of teaching ESP.

5. *Evaluation*: this stage involves both teachers and authorities to assess the designed course, the way it was implemented, besides the effectiveness of the adaptable ESP framework in yielding desired outcomes.

Benabdallah's ESP framework for course design is highly appreciated and recommended to be tried out in real context. It is addressed not only to teachers and students, but even to the authorities. In other words, all stakeholders are concerned with incorporating efforts to achieve a successful and fruitful ESP course. Moreover, the flexibility of this framework makes it always open to further refinement and amelioration to meet the increasing and changing needs of different educational settings and environments. Consequently, it is found a suitable reference for designing a national university level ESP course wherein the determination of goals and objectives that pertain to 21st century higher education requirements has to be highlighted before anything else.

IV.1.3. Coping with 21st Century Higher Education Requirements: Determining Objectives of ESP Teaching/Learning:

One central aspect that necessitates careful and thoughtful consideration in ESP teaching is the determination of clear objectives that pertain to 21st century higher education requirements. In fact, lack of pre-determined achievable objectives in any educational field, including ESP, could undoubtedly entail serious problems that often result in the failure of the teaching/learning process. The same thing can be observed in the Algerian ESP context wherein the non-existence

of official syllabi has led to the absence of well-defined ESP teaching objectives. That is why it is highly recommended for decision makers to reconsider the aspect of determining clear-cut objectives of ESP teaching/learning in Algerian universities. These objectives, however, have to pertain with 21st c. higher education requirements to cope with nowadays challenges brought by continuously growing world changes.

As it has already been mentioned, 21st c. international circumstances have brought new survival alternatives urging world countries into more globalized decisions in different fields. This has resulted in creating more cooperative polities that can support the adoption of an international higher educational system that may face the challenges imposed by the new millennium. In this vein, concepts like employability and mobility have become the primary concern on 21st c. universities wherein the success of the students, as future professionals, is tightly linked, besides the subject of their study field, to the mastery of English as the international language of science, technology, business, internet, medicine, politics, etc. Consequently, and as put forward by Sophocleous, et al., since "the demand for more highly skilled and qualified 21st century professionals is increasing, and vast amounts of populations are moving from one place to another worldwide, the numbers of ... ESP courses are constantly growing." (2019, p: 02)

Coping with what has just been stated above, Algerian ESP decision-makers are urgently called to put into effect a well-designed ESP course that is supported by clearly determined objectives of ESP teaching/learning, and which can respond to the international higher education policies and expectations. Neglecting the significance of designing an ESP course with well-defined and achievable objectives will, undoubtedly, always rank the Algerian university low among international higher institutions. Therefore, it is suggested to revisit the main objectives of teaching ESP in the Algerian context. Following Basturkmen[27] (2006, p: 133), teaching ESP can be based on five broad objectives:

1. To reveal subject-specific language use.
2. To develop target performance competencies.
3. To teach underlying knowledge.
4. To develop strategic competence.
5. To foster critical awareness.

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[27] For more details see chapter one

The objectives proposed by Basturkmen represent a holistic approach to ESP teaching as it takes into consideration all aspects needed for the learners' academic as well as professional development. Basturkmen's broad guidelines can be adapted by Algerian authorities in identifying the focal elements that ESP teachers have to develop in their students at the tertiary level. Of course, this can be done with reference to those students needs analysis as well as to institutional expectations. In the same vein, it is worth noting that Basturkmen's fourth and fifth objectives, namely: developing strategic competencies and fostering critical awareness have been the key components of the present research, particularly in terms of developing ESP students' strategic reading through fostering their critical reading awareness of specialized field materials. Moreover, both objectives have been discussed with details through suggesting content, activities, and classroom procedures that can make them achievable, precisely among engineering students.

Consequently, it is supposed that the teaching of ESP in Algerian context has to reflect and realize precise and obvious aims and purposes. It should be aimed to enhance the students' general and professional English communicative competence to enable them to communicate efficiently in various settings. It has also to consider the development of the students' declarative and procedural knowledge, especially in terms of the different significant skills that permit to enhance their know-how abilities. Furthermore, increasing students' autonomous learning capacity is also highly called for to be established among the principal objectives of ESP teaching since it is found vital for empowering students to engage into life-long learning that transcends compulsory education. Moreover, ESP teaching must as well revolve around developing students' cognitive and metacognitive skills which may boast their positive attitudes towards the target language. Eventually, it is similarly recommended that teaching ESP in the Algerian university should focus on promoting the students' critical awareness through integrating critical reading strategies development in the ESP course. Taking the above statements seriously would undoubtedly help the students act adequately in various academic and professional environment. Nevertheless, the realization of the above objectives would, for sure, need well trained ESP practitioners that can effectively participate in making the ESP teaching/learning process a successful experience. In fact, ESP teachers' training is another undeniable issue that has to be taken care of by Algerian policy-makers as will be highlighted in the next recommendations.

IV.1.4. Pre-service and In-service Teacher Training:

The issue of teacher training also creates a serious obstacle in front of the development of ESP teaching/learning in Algeria. Frankly, there exist no training programmes at all for either EFL or ESP teachers. Moreover, the practice of ESP teaching is usually taken in charge by some graduates who pursued university studies in general English language and literature for academic purposes, i.e. they have never been trained in how to teach even in EFL. These same graduates are legible, in the Algerian university, to teach ESP for different specialties: medicine, business, science and technology, etc. What makes the situation worse is that most of these graduates have either a Bachelor of Master degree, i.e. they are part-time teachers. In other words, they are not really committed to the job of teaching but they rather do it for the sake of earning a living or sometimes for getting teaching experience.

Furthermore, this situation is worsened by the fact that these teachers have no relationship with the professional field they are involved in. Put another way, most teachers of ESP do neither know the specific language nor the specific content or subject matter of the ESP course afforded to a given group of students. This lack of language and content knowledge has often thrown the Algerian ESP teacher in a critical situation that obliges him/her to teach general English instead of catering for the specific needs of their students, simply because they are not in how to behave in such a context.

For that, it is highly believed that giving importance to teacher training constitutes the first step towards granting ESP teaching/learning its deserved place in Algeria. Teachers have to undergo training programmes in order to be able to do their job properly and be capable to develop professionally. The absence of training programmes for Algerian ESP teachers would never sustain them to improve and progress in their profession. Relevant to this, it is strongly believed that the mastery of English language is not the only training that language teachers should pursue. However, their training should focus as well on teaching methodologies, materials development, course design, etc. In this vein, Valdes (1986: 103) states that "a better command of the target language by the teacher is necessary but not a sufficient condition. Teacher training, for them, includes an important element of methodology, classroom observation, materials trial and development, and so on". For this, it can be said that both pre-service and in-service teacher training programmes are significant for ESP teachers.

Pre-service teacher training refers to the process by which teachers are required to attend a series of lectures in general language mastery before being assigned the job of teaching. In the

case of Algerian universities, these lectures emphasize some sciences which underpin the teaching of English as a foreign language (TEFL). As such, a prospective ESP teacher is trained in the same way as a prospective EFL teacher, whose education includes, but is not limited to: Linguistics, Phonetics, Psycho-pedagogy, besides English literature and civilization. This kind of training enables English language teachers, in Algeria, to acquire a sound basis in general EFL which is not enough to deal with a context wherein English language is supposed to be taught for specific purposes that respond to specific needs of a particular group of students. As put forward by Savas "language teachers are trained to teach linguistic knowledge rather than a content subject... Teachers of ESP are therefore ... much less informed about the content of what they are expected to teach than even their students, who have been studying their subjects all through their school years." (2009: 398). For this, it is suggested that, in addition to general knowledge of the target language, pre-service ESP teachers training should take into consideration other elements like: needs analysis, materials selection and/or development, syllabus design, etc. Moreover, practice must also be highly emphasized in the pre-service training programme and further reinforced in the in-service training phase.

The practice of teaching in the pre-service period would enlighten teachers' knowledge of the profession as it gives them an opportunity to put into what they have been studying during their theoretical years. As a first step towards effective teaching practice, teacher trainees can attend and observe other teachers as they can be given the chance to practice teaching under a trainer's supervision. In doing so, prospective teachers are supposed to receive help from their teacher trainers through monitoring, guiding, and providing feedback. Moreover, this training is so significant because it introduces beginner teachers into their actual profession. Therefore, it should not stop here; rather it should continue even once in-service through well-designed in-service teacher training programmes.

In-service teacher training, on the other hand, is meant for the different programmes afforded for those teachers who are actually practicing the job of teaching. Although, already involved in teaching situations, teachers may need further training that can provide a great assistance to them to develop professionally. Not only this, teachers have to update their declarative as well as procedural knowledge to meet worldwide instant changes. This can be attained by means of seminars, conferences, workshops, study days, and so on. In the case of ESP teachers, they can attend events organized by specialists of the field they are concerned with. For this Savas (ibid: 402) claims that "language teachers and prospective language teachers

can attend professional development workshops to let themselves acquire a second field of expertise, such as medicine, engineering, or law."

Furthermore, as reviewed by Mebitil, there exist several worldwide teacher training programmes. These can be classified into two types, mainly: public and private. Public training programmes are run by public institutions whereas private ones are offered by private institutions. These training courses are principally aimed to prepare teachers in different EFL areas like: ESP, EAP, EBP, and so on. The same author makes reference to another kind of training courses called '*tailor-made courses*' which "are tailored or designed to meet the trainees' real needs, their level of English language proficiency, their actual situation and future prospects, in case the customer asks for a type of ESP courses which is not included in the list that the school or institution offers" (2015: 59)

From her part, Mebitil has suggested a formal pre-service teacher training programme named "Master in English for Specific Purposes" to solve the problem of qualified ESP teachers in Algerian universities. This course is primarily aimed at providing learners with solid formation to be able to follow further studies in various areas of ESP. Relevant to this, learners are supposed to acquire knowledge about essential elements related to ESP, to wit: the growth of ESP research, development of ESP teaching, syllabus design, and course delivery, besides needs analysis. The course, as such, is composed of four semesters: three semesters are devoted for acquiring fundamental theoretical knowledge about ESP whereas the fourth semester is based on the practice of teaching under supervision and dissertation preparation. In fact, Mebitil's suggested training course is highly appreciated and recommended to be applied in real context in order to solve at least one of the several issue that handicap ESP teaching in Algeria.

But what if these programmes are far from being affordable?

Until that the authorities will be able to cater for ESP teachers training, ESP teachers should not wait for changes to occur, instead they have to take the initiative to change. For example, they can rely on themselves to train themselves. Therefore, with the enduring absence of training programmes, self-training is thought of as an efficient solution to be adopted by Algerian ESP teachers in order to sharpen their teaching abilities and reinforce their knowledge of the ESP subject matter they are supposed to deal with. Self-training is then highly recommended to ameliorate teachers teaching practices. In fact, it is an inevitable element in any teacher's professional development career.

Nevertheless, it has to be confessed that despite its vital role in enhancing teachers' professional achievements, self-training cannot replace officially organized ESP teacher training programmes. The latter, are often designed and scheduled by highly qualified institutions and competent experts in ESP syllabus design, needs analysis, materials development, course assessment, etc. These tasks which make actually part of the ESP teacher's role have to be monitored and assessed by ESP experts, especially when they presented by novice ESP teachers. Therefore, self-training is fundamental for prospective ESP teachers but it has to be coupled with official training programmes to be able to yield sufficient outcomes mainly in terms of teachers' effective classroom practice as well as professional development.

Eventually, it is worth noting that professional and academic training programmes are currently inevitable requirements. Thoughtful attention and enormous importance have to be granted to ESP teacher training programmes in Algeria. It is strongly emphasized that ESP teachers have to receive sound training during their pre-service education. They have to be instructed in how to measure their learners' specific needs and then how to analyse them. They must know how and be able to design ESP syllabi, how to select and/or develop ESP teaching materials, which teaching methodology or practice suits a particular class or group of learners, and how to assess a particular learning experience, including learners' performance. All these aspects must be made clear and obvious to every ESP teacher before going into practice, and every ESP teacher has to practice ESP teaching prior to his/her involvement into official service. Once this is achieved, at that moment it can be said that Algerian universities have professionally well-trained ESP practitioners; ESP practitioners who are able to serve local ESP teaching situations and competent enough to share ideas and expertise with their national as well as international counterparts.

IV.1.5. Interdisciplinary Teacher Collaboration:

For ESP teaching/learning to be a successful learning experience, especially in the Algerian context, it is suggested to be supported by interdisciplinary teacher collaboration. As maintained by many researchers, collaborative teaching has become a fundamental aspect in enhancing tertiary educational achievements, as it involves the cooperation of two teachers or more for doing the teaching profession. Therefore, it is generally thought of this kind of teaching as "a continuum, where collaborative activities vary depending on teachers' level of involvement and responsibility" (Tiongson, 2018: 33). Moreover, interdisciplinary teacher collaboration is

also based on teachers' collaboration within and across institutions to further effectively plan, teach, and assess courses (Lee, 2008).

In the field of ESP, interdisciplinary teacher collaboration implies the collaboration of English language teachers with content specialists which may help them find out the academic and professional competencies needed by students with reference to their corresponding study areas. This can also sustain them to integrate content with language learning (Dudley-Evans and John, 1998) which is a highly required approach in teaching ESP. Furthermore, collaboration with subject specialists would enable language teachers to learn more and enrich their background knowledge about the discipline they are involved in, which may create for them more opportunities of professional development. Consequently, it can be argued that collaboration with content specialists is very important to design efficient ESP courses wherein subject-relevant resources can be effectively determined by instructors who are more aware of the concerned discipline.

Additionally, because of its undeniable importance, many researchers have appreciated the interdisciplinary approach to ESP programmes development. In this vein, Dudley-Evans and John (1998) propose three levels of cooperation in ESP teaching. These levels are identified as follows:

1- _Cooperation_: this involves lower-level advice and guidance from the part of the specialist teachers as language teachers enquire to collect data about their students' needs with reference to their subject course.
2- _Collaboration_: it is more advanced than cooperation in that ESP teachers work together with subject specialists to design adequate syllabi and construct appropriate classroom activities through consulting together the constituent parts of the educational field.
3- _Team_-teaching: this revolves around the involvement of both English language and specialist teachers in the ESP classroom in order to teach together the same material at the same time.

So it can be noticed that the degree and the nature of interdisciplinary teacher collaboration changes according to the extent to which language and subject teachers are involved together in the process of designing the ESP course, selecting and/or developing teaching materials, and delivering content to the concerned students.

From his part, Barron (1992) suggests a model of collaboration which is based on a continuum of integration between language instructors and subject specialists. This continuum

alternates with the changing role of the subject specialist throughout the language teaching process. Relevant to this, the subject specialist can serve as an informant only through guiding and advising the language teacher to be more informed about a certain subject of interest. Then, the subject specialist can serve as a consultant through participating in course design, or sharing expertise with the language teacher to ensure the effectiveness of the ESP course content. More than that, the content specialist can be a collaborator, especially when taking part in the ESP course planning, teaching, and assessment but without sharing the same classroom. Eventually, the highest degree of integration is as a colleague. This involvement requires the content specialist to sustain the language teacher in performing the whole task of teaching; they share even the same classroom. In fact, Barron's model of interdisciplinary teacher collaboration does not differ a lot from the one proposed by Dudley-Evans and John.

On the other hand, though interdisciplinary collaboration benefits teachers to a great extent, it may create some challenges and difficulties. It is good when teachers share expertise and mutually enrich their background knowledge about in terms of the concerned field language and content. It is also beneficial, as it helps teachers to enhance their professional development opportunities as teachers get aware of each other teaching methodology and practices. Even for students, it can be helpful to increase their motivation in order to learn more about the subject field in the English language.

However, this type of collaboration may as well cause some difficulties. For example it can be time consuming which entails the need for more efforts form the part of both teachers (Jordan, 1997). Moreover, as argued by Barron (2003), collaborative teaching may not lead to satisfying learning outcomes. For this, perhaps, Hutchinson and Waters (1987: 160) deduced that ESP teachers "have to struggle to master language and subject matter beyond the bounds of their previous experience". Nevertheless, even with reaching a high level of familiarity with the discipline involved in, ESP teachers have to collaborate with subject specialists to ensure a more successful ESP course that can effectively respond to a given group of learners' needs and expectations.

IV.2. Pedagogical Implications and Recommendations:

As mentioned earlier, this research revolves around the promotion of critical reading strategies among Algerian ESP students. Based on a mixed-method experimental research design, it was possible to prove that training ESP students explicitly into critical reading strategies use helped them a lot in: (1) increasing their awareness and use of these strategies, (2)

enhancing their motivation towards learning the English language in general and the reading skill in particular, and (3) improving their understanding of field-related documents as well as promoting their critical reading abilities. With reference to these results, and after setting the ground for different possibilities that can sustain the Algerian ESP project, this section of recommendations concerns mainly pedagogical aspects. In this vein, the administrators are the first stakeholders to be addressed in this section for being the primary responsible for changing perspectives towards ESP teaching, especially in technical departments. New perspectives have to support the adoption of critical pedagogy in teaching ESP. The latter has to be revisited in terms of time allocation, selection of qualified teachers, provision of teaching materials and resources, and so on.

This section tries also to highlight the role of ESP teachers in promoting critical reading strategies among their students. These teachers have to reconsider the place of the reading skill within the ESP course. Randomly selected readings, then superficially explained, would never help ESP students to get the maximum benefit from their English course in general and the reading material in particular. Thus, integrating critical reading strategies within the ESP course should be the primary concern of ESP teachers. Similarly, from their part, students have to change their misconceptions about their English language teacher; they ought to stop thinking of their teachers as fountain of knowledge. Instead they have to positively collaborate with their teachers and colleagues through participation, sharing ideas and integrating group work. They have to be open-minded to learn new things like the development of their critical reading abilities.

IV.2.1. Changing Authoritative Policies and Practices: Towards Adopting a Critical Approach to ESP Teaching:

International higher education policies and practices are changing in order to meet the changing requirements of the modern world. Individuals in this modern society are required to master different skills and strategies to be able to stand in front of the challenges that surround them. This would, undoubtedly, entail that knowledge construction has to be achieved through active engagement and participation in order to develop competencies that transcend the walls of teaching classroom into real life context. For this to be fulfilled, however, there is an urgent need to shift from the traditional pedagogical approaches with its emphasis on spoon-feeding instruction to a more critical pedagogy that can create competent students who able to critically

engage in discovering and building new knowledge through sharpened higher order thinking skills. The latter, indeed, are the focal point of the critical pedagogy.

In fact, critical pedagogy has recently been acknowledged by researchers as being crucial to the teaching of English as a foreign language, especially for specific purposes. For this, Rao argues that critical pedagogy in EFL "takes as joint goal to develop simultaneously ELL's communicative ability and the ability to apply it to the cultivation of critical awareness of the world and the ability to act on it to make changes and improvements" (2018, p:46). As such teaching EFL should go beyond the aim of developing the learners' communicative competence to that of enhancing their critical awareness which implies the development of their critical reading abilities. In the case of ESP, Belcher put forward that critical pedagogy revolves around "revisioning text as not just situated in a context but the hybrid product of multiple contexts, i.e., as a site for negotiating of personal and social identities, of home and academic or professional values" (2004, p: 175). Relevant to this, it is recommended that ESP teaching in Algerian universities has to be approached from a critical point of view. For example, they can emphasise the point that scientific texts should not be treated for the sake of extracting information; instead they have to be read critically to get what is implied beyond the lines. In this case, and as this research suggests, integration of critical reading strategies should constitutes a significant part in the design of the ESP course.

Moreover, time allocation is another issue that has to be taken into consideration by the administrators. In most of, if not all, Algerian universities, the ESP course is allotted one hour and a half per week, and this timing is often scheduled as the last session in the students' time table. As such most students either do not attend or feel reluctant to follow and participate when attending the English class. Therefore, it is better to reconsider the timing of the ESP course in a way that can make the students feel more motivated to integrate and enjoy learning at the same time. In the same vein, it is also preferable to denote two sessions, of one hour and a half for each, per week so that students can be able to raise their language proficiency level.

Administrators are as well called to provide ESP teachers with relevant teaching materials and resources. Though the importance of the ESP course is highly recognized among authorities and administrators there is still a wide gap between how these authorities perceive the ESP course and what they are actually able to offer for its enhancement. Yet, in mid this gap, Algerian ESP teachers always find themselves obliged to struggle in search of suitable materials

for their classes or in an attempt of developing a syllabus, which rarely meets the real needs of their students, on their own. Depicting such a situation, Bouroumi says:

> "From university to university, from faculty to faculty, from department to department, ESP courses are being weakened or rendered ineffective -unwillingly, unconsciously- by some administrators or bureaucratic practices. ESP teachers are continuously trying, and on their own, most of the times, to change some 'realities', to cope with big issues, and to surrender to others" (2018, p: 05)

Furthermore, administrators are also responsible, to a certain extent, for teachers and students' motivation towards the ESP course. As part of higher education authorities, administrators should work hardly to provide a suitable atmosphere for the practice of ESP. For example, they can organize workshops and training programs for teachers to improve their teaching methodology and enhance their professional development. They can as well encourage teacher collaboration through supplying needed materials and resources that may help them increase the efficiency of their teaching performance both inside and outside the classroom. Administrators can even participate in enhancing students' motivation towards learning the target language in general and the reading skill in particular. In this case, for instance, responsible at the library have to revise and update their English language bibliography list, in that they should focus on bringing resources that may sustain students to increase their higher order thinking skills and strategies instead of concentrating on grammar books and the like. Organization of study days to highlight the importance of English language learning, especially for science and technology field is also found an effective way to promote both teachers' and students motivation towards the ESP course.

Eventually, it is highly believed that administrators play a vital role in the improvement of the ESP teaching process. In that, the administrator has always been the focal point that brings teachers and students together. Therefore, to enhance the ESP course in general and critical reading in particular can only be pushed forward by the collaboration of the administration through supplying resources and facilities. However, until that should be possible, teachers are also required to play their role as ESP practitioners taking into consideration all the obstacles and difficulties that can be encountered along their journey in the heart of the ESP field.

IV.2.2. Teacher Role to Promote Critical Reading among ESP Students:

With reference to the fast developments and changes that have been brought by the current digital world, teachers are required, more often than not, to rethink their role in the language

classroom, especially in the ESP context. They have, in fact, to seriously ponder on the new concepts imposed by the critical pedagogy, and how to adapt them to the requirements of the ESP area. This will, undoubtedly, create an urgent need to shift from the traditional practice of teaching ESP that is based on grammar and superficial reading of specialized material to a more critical approach that is aimed at enhancing students' higher order thinking skills. Therefore, critical reading of the specialized material should constitute a crucial element in the ESP teaching/learning process.

In fact, language teachers have been attributed different roles. For instance, they have been viewed as controllers, organizers, assessors, prompters, participants, resources, tutors and observers (Dornyei, 2002). Besides these characteristics, the ESP teacher, is not only a language specialist, but even a practitioner who is more concerned with course design, needs analysis, materials selection and/or development, assessment, and course evaluation. In this vein, Dudley-Evans and St. John (1998) suggested that ESP as a multi-dimensional area has assigned the ESP teacher various significant roles to perform. Plying such roles requires the ESP practitioner to be a researcher, a course designer, materials developer, language instructor, learning and course evaluator, motivator, collaborator, creative and facilitator. Therefore, it is highly required for the ESP practitioner, while performing these roles to be aware of "the psychological needs, profound knowledge,... of ESP" (Ibrahim, 2019, p: 77). For this, ESP teachers are referred to as practitioners[28] because their roles go beyond that of general English language teachers.

More than that, the ESP practitioner has to be aware of the latest developments in the field of language teaching in general and ESP in particular. Relevant to this, as recent developments in the area of ESP has shifted interest to the learning process and learners' learning styles and strategies, teachers have to take this into consideration. As such, teachers should shift their focus from emphasizing the language entity or aspect to learn to how this aspect has to be learnt or the different ways, skills, or strategies that can help learners successfully acquire this language aspect. In this way, Bouklikha presumed that, nowadays, the teacher's role has changed and tends to be more focused on: "The role of facilitator or guide so as to increase student motivation and develop the skills and strategies that make a student more competent and to structure the learning environment" (2012: 97). Bringing this view together with modern critical perspectives to ESP teaching/learning, ESP teachers, nowadays, are recommended, more than any other time, to enhance their students' critical reading strategies that can enable them go beyond the

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[28] This term was first coined by Swales (1985)

superficial meaning of the reading material. Consequently, it is strongly believed that the modern role of the ESP practitioner is to promote critical reading among their students. This can be achieved through a well established process starting with enhancing students' critical reading strategies awareness and use, which may, as well, imply measuring their current critical reading strategies use, increasing their motivation towards the reading skill, and developing their academic achievement. Amid this process, the teacher has to be an instructor, facilitator, guide, collaborator, assessor, evaluator, and so on.

IV.2.2.1. Measuring Students' Critical Reading Strategies Awareness:

As it has already been mentioned in chapter two, measurement or assessment of students' learning performance is a crucial aspect of foreign language learning. It is a tool that allows teachers to come close to the real competence of their students in a given area or skill like reading, writing, speaking, and so on. For example, teachers can measure their students' reading performance to know to what extent they are able or not to do a particular task as far as the reading skill is concerned. In doing so, teachers are allowed to collect data about their students' performance so that to help them later to improve or promote a given skill through adapting new teaching methodologies, designing new activities that respond to the students' detected level after measurement.

Measurement can also be used when introducing students to a new learning aspect or experience. In the case of the present study, critical reading strategies have been suggested to be integrated into ESP instruction as a new language learning aspect. However, before introducing this language learning element that deals mainly with the reading skill, it is strongly believed that measurement of students' critical reading strategies should be the first step in this new learning experience. A prior measurement of students' critical reading strategies would certainly enable the teacher to find out whether their students are aware or not of something called critical reading strategies, whether they are able or not to use these strategies to get the maximum benefit from their reading materials, and to what extent they are able to do so. As such, measurement in this case can be viewed as a kind of diagnosis of students' critical reading abilities before being instructed in how to use the strategies of critical reading.

Traditionally, especially in the Algerian ESP context, students' language abilities are usually measured using traditional test[29]. These tests are mainly based on the reading skill

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[29] More details about the concept of traditional tests are provided in chapter three.

including at the same time some grammar and writing tasks. The test starts with a selected text that often has a link to the students' study area, for example hydraulics. Then, a set of reading comprehension question follow the text. It is remarkable that the answers to these questions are directly stated in the selected text. So that students are not required to read deeply or beyond the lines to find out the target answers. Sometimes, the comprehension questions are followed by true/false statements and/or finding synonyms and opposites to a given set of words and expressions. Of course, the answers are always stated in the proposed text. The second part of the test is often focused on grammar activities about tenses and/or transformation of sentences from passive into active voice and vice versa, or forming conditional statements from suggested phrases.

Moreover, and in most cases, the test ends with a written expression task in which the topic the students are asked to write about has a tight link to the one chosen for the reading comprehension section. This, unfortunately, makes the majority of the students to write back the reading comprehension text instead of thinking and writing about the suggested topic of the written expression activity. This is, in fact, a typical Algerian test aimed to measure students' English language performance, precisely reading abilities in a typical Algerian ESP context.

In fact, language researchers have proposed a variety of measurement tools that can aid teachers to assess or evaluate language learners' performance in general and the reading skill in particular. Thus, besides the traditional comprehension-based tests as explained above, there exist other alternatives to language learners' competence as far as the reading skill is concerned. These alternatives include both quantitative and qualitative measurement instruments designed particularly to evaluate the reading skill among language learners. Both types of measurement are effective to a certain extent to diagnose readers' competence in the foreign language context.

In the same line of interest, Mokhtari and Sheorey (2001) proposed the SORS[30] which is one of the most effective and recent alternatives to measure EFL students' reading strategies. This was later developed into the MARSI[31] by Mokhtari and Reichard (2002). Both surveys have been used internationally and translated into multiple languages to cope with various learning contexts. They have as well been employed by many researchers to measure EFL and ESP learners' reading strategies. Furthermore, in an unprecedented study Bensaad and Ouahmiche

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[30] The SORS has been well explained in chapter three.
[31] Also explained in chapter three

(2020) have adapted Mokhtari and Sheorey's SORS[32], to cope with circumstances imposed by the Algerian ESP environment, wherein some elements have been modified, others eliminated, and some were added with reference to the students' suggestions and recommendations. Worth noting also is that Mokhtari, Dimitrov, and Reichard (2018) have recently provided a revisited version of the MARSI, where the thirty two items of the survey were minimized into 15 strategy statements only after conducting a confirmatory factor analysis of the MARSI.

From his part, Larcking (2017) tried to measure ESP students' critical reading strategies while reading field related material. Larcking's survey differs from the SORS and the MARSI in that it is more concerned with measuring ESP students' critical reading abilities, so that it is more focused and mostly linked to the purpose of the present study. Nevertheless, despite its importance Larcking's survey does not fir the interest of the current study, especially in terms of research context; in that Larcking's research revolves around social sciences context mainly, while this research concerns engineering field primarily.

Therefore, in an attempt to respond to the lack of a survey that can meet the needs of Algerian English learners for engineering purposes, the researcher has designed the critical reading strategies awareness questionnaire[33] (CRSAQ). This questionnaire comes out of a long process of investigation and continuous attempts and revisions. Yet, it has not been adopted until it was examined and validated by the supervisor of this research as well as the collaboration of both national and international ESP teachers and experts in the revision process. Consequently, it is enormously believed that this questionnaire can be an efficient tool to measure ESP students' critical reading strategies awareness at least in the Algerian context. However, it is as well thought that this same questionnaire can be further revised to meet changing circumstances and different needs.

As far as this study is concerned, CRSAQ was utilized as a fundamental research tool to find out ESP students' critical reading strategies awareness and use while reading scientific documents, principally in the field of hydraulics at the ENSH. The questionnaire was administered after giving the students a specialized text to read. Data detected at this stage helped the teacher/researcher to discover the students' needs, lacks and wants mainly in terms of critical reading strategies so that to be able to decide upon the elements to be considered while integrating those strategies into ESP instruction. Then, after instructing these students into what,

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[32] Check chapter two and three for more explanation of the SORS and the MARSI.
[33] See chapter two for more details

when and how to use critical reading strategies, the same questionnaire was conducted to find out the difference between the students' prior and later performance. As expected, the results have revealed a huge difference in the students' performance before and after being instructed into critical reading strategies which confirmed, indeed, the effectiveness of the developed questionnaire.

In addition to quantitative measurements like traditional tests and questionnaires, there exist also qualitative measurements like think aloud protocols, study diaries or reflective journals. These qualitative measurements are informal ways to evaluate students' reading comprehension competence during the reading process. For example, think aloud protocols involve the verbalization of the reader's mental process or cognitive events while s/he is reading. As such, the reader or the student may be asked to describe verbally the way s/he in undergoing to answer comprehension questions. In other words, this protocol requires the students to be able to orally express their cognition or what they are thinking about during the performance of a given task of reading. Thus, think aloud measurement is so effective to detect thinking processes which cannot be uncovered via questionnaires. In this vein, Simons (1971) suggested the procedure mentioned below for better administering and scoring a comprehension think aloud protocol:

I.   *Preparing the text:*

Choose a short passage written to meet the following criteria:

1. The text should be from 80 to 200 words in length, depending on the reader's age and reading ability

2. The text should be new to the reader, but on a topic that is familiar to him or her. (Determine whether the reader has relevant background knowledge by means of an interview or questionnaire administered at a session prior to this assessment.)

3. The text should be at the reader's instructional level, which can be determined by use of an informal reading inventory. Passages at this level are most likely to be somewhat challenging while not overwhelming readers with word identification problems.

4. The topic sentence should appear last, and the passage should be untitled. Altering the text in this way will elicit information about the reader's strategies for making sense of the passage and inferring the topic.

5. The text should be divided into segments of one to four sentences each.

II.   *Administering the think aloud procedure:*

1. Tell the reader that he or she will be reading a story in short segments of one or more sentences.

2. Tell the reader that after reading each section, he or she will be asked to tell what the story is about.

3. Have the student read a segment aloud. After each segment is read, ask the reader to tell what is happening, followed by nondirective probe questions as necessary. The questions should encourage the reader to generate hypotheses (what do you think this is about?) and to describe what he or she based the hypotheses on (what clues in the story helped you?).

4. Continue the procedure until the entire passage is read. Then ask the reader to retell the entire passage in his or her own words. (The reader may reread the passage first.)

5. The examiner might also ask the reader to find the most important sentence(s) in the passage.

6. The session should be tape-recorded and transcribed. The examiner should also record observations of the reader's behaviours.

III.   *Analysing results:*

Ask the following questions when analysing the transcript:

1. Does the reader generate hypotheses?

2. Does he/she support hypotheses with information from the passage?

3. What information from the text does the reader use?

4. Does he/she relate material in the text to background knowledge or previous experience?

5. Does the reader integrate new information with the schema he/she has already activated?

6. What does the reader do if there is information that conflicts with the schema he/she has generated?

7. At what point does the reader recognize what the story is about?

8. How does the reader deal with unfamiliar words?

9. What kinds of integration strategies does the reader use (e.g., visualization)?

10. How confident is the reader of his/her hypotheses?

11. What other observations can be made about the reader's behaviour, strategies, etc.?

Besides think aloud protocols, study diaries or reflective journals are also very important qualitative measures of students' critical reading strategies performance. This type of measurements has been widely used by language researchers in collecting data about to assess language learners' performance in reading comprehension. Study diaries or reflective journals are effective in that they help the students to ponder on their reading process before, during, and after the reading activity. This practice would undoubtedly sustain the students in understanding their way of approaching texts and how to improve it in the future. They are also helpful the teachers as they supply them with a detailed assessment of the students' reading comprehension performance. Not only this, they can even increase students' critical reading strategies through writing immediate responses to the reading material. As put forward by Aspari "this means that having students compose a response also teaches them critical thinking skills, such as analysis, interpretation, inference, and synthesis of knowledge." (2018, p.40)

Furthermore, for an effective way of keeping language- learning or teaching diary, as cited in Bailey (2015), Nunan and Bailey (2008) suggest for diarists to follow the steps mentioned below:

- Set aside time each day to write in your diary, as soon as possible after class;
- Write in a quiet, comfortable place and if you are word processing the journal entries, save them regularly;
- Carry a small notebook or personal digital assistant (PDA) in order to make brief notes as events occur;
- The time devoted to writing in the diary should be equal to the time spent in the language class; however, in an immersion context, you should consider focusing the diary entries on some part of the teaching/learning experience, so you don't get overwhelmed with the need to keep up with the generation of data.
- The diary should be kept in a safe, secure place so you can write candidly;
- When you are making journal entries, do not worry about style or grammar, especially if you are writing in your second language, as the journal entries can be edited later;
- When you write a comment in your journal, provide evidence for the statement and give concrete examples;
- Make notes at the end of each diary entry about thoughts or questions you may have, so can address them later.

Eventually, it has to be noticed that both quantitative and qualitative measurements are crucial aspects in reading comprehension assessment as they are for critical reading strategies evaluation. Therefore, teachers are recommended to choose whatever means of assessment they see suitable for their teaching context and use it to better diagnose their students' behaviour while reading field related material. It as well strongly believed that mixing both tyes of measurement (qualitative and quantitative) is better than using only one instrument, especially when intended for measuring ESP students' critical reading strategies. In that tools triangulation can most likely yield more reliable and validated results. That is why the present study has relied on the CRSAQ, reflective journals, and the critical reading test to assess ESP students' critical reading strategies awareness at the ENSH. All in all, measuring students' critical reading strategies awareness has to occur first in the process of integrating critical strategies into ESP instruction.

IV.2.2.2. Determining Achievable Objectives:

Another crucial aspect in foreign language learning is the determination of clear teachable course goals and objectives. In fact, a course without any pre-determined objectives can by no means be evaluated as a successful course. The same thing can be said for the ESP field. In order to get the maximum benefit from the ESP course, teachers have to make clear which kind of goals and objectives they intend to reach by the end of their course, especially with taking into consideration the needs of their students as well as the surrounding circumstances imposed by the teaching/learning environment. Meanwhile, teachers have to bear in their minds that the goals and objectives of their course have to be overtly stated to their students as this may increase their motivation and interest towards the course.

As far as the present study is concerned, determining achievable objectives should take place after measuring the students' critical reading abilities. Based on the data yielded by the measurement, teachers can identify which kind of critical reading strategies their ESP students need to promote or acquire and set them as the main objectives of their course. However, these objectives should be distinguished, yet derived from the principle goal of the whole course. In that course goals are different from course objectives as the first is too general whereas the second is too particular[34]. As such, the main of the current case is the promotion of ESP students' critical reading, especially in terms of raising their strategy awareness and use. Based on this goal, course objectives can be established to promote the employment of different strategies that

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[34] To know more about the difference between course goals and objectives check chapter one.

can help achieve the main goal of the course which is the development of critical reading as a skill.

Concomitantly, objectives can be turned into goals from which other new and more specific objectives are derived. To illustrate, in case the primary goal of an ESP course is the to raise students' awareness of critical reading strategies, objectives can be set to make students able to use planning strategies, interpretive strategies, and evaluative strategies. Yet, when considering further details, for example, planning strategies promotion can become a main goal of a lesson with particular objectives established to make students able to:

- Identify the purpose of reading to increase motivation towards reading
- Preview the selected document to predict its main topic.
- Preview the document to find out its relevance to the students' reading purpose.

Another example, when the goal of the lesson is to promote the students' interpretive strategies, the objectives should be targeted towards enabling the students to:

- Question and infer information in the text.
- Annotate and take notes while reading.
- Analyse information in the text while reading.

Yet, questioning and inferring strategies development can be the goal of another lesson wherein the objectives are destined to render the students able to:

- Raise/form questions from headings and sub-headings of the text.
- Predict the upcoming information in the text.
- Keep questioning while reading.
- Infer the major ideas of the topic from titles or first sentence of each paragraph.
- Infer implicit information especially when it is crucial to understanding.

So, it is worth noting that the determination of teachable and achievable objectives is primordial for any course in general and ESP in particular. Similarly, the goal of promoting critical reading strategies among ESP students must entail the clearly stated objectives that should address more particular aspects of these strategies. Doing so, it will be easy for teachers to proceed smoothly along the different steps constituting the process of their ESP course. Meanwhile, this can create a positive learning atmosphere wherein everything is made obvious and clear. Even students will show high level of motivation and interest in their English

classroom as they are already made aware of what they are going to achieve by the end of the course. Relevant to this, Algerian ESP teachers are advised to move away from the traditional practices of keeping everything mysterious and hidden which often creates a wide a gap between the teacher and the student and even between the student and the course as a whole. Therefore, ESP teachers in general and Algerian ones in particular, are urgently called to make every tiny aspect of their course clear to the students from the beginning until the end, so that to avoid any kind of problem that ambiguity often entails.

IV.2.2.3. Integrating Critical Reading Strategies:

Now that the measurement of students' critical reading strategies is accomplished and achievable course goals and objectives are established, the ESP teacher can move on to the integration of critical reading strategies into ESP instruction. For doing so, a direct explicit instruction is found the most suitable teaching approach in this case. Here, the strategies that can enable students to critically read field related material in English are overtly explained and shown to them. In turn the students are given the opportunity to practice the learnt strategy until mastery is achieved. It is worth noting here that students are not only instructed in what these strategies are but when and how to effectively use them while dealing with specialized material. The role of the teacher is to model the target strategy, help and guide students throughout the process of practically learning the strategy, and gradually shift control when the students are able to perform what has been learnt alone.

As reviewed in chapter two concerning explicit instruction and its effectiveness in enhancing learners' strategy use, especially in terms of critical reading, this study has tried to integrate critical reading strategies into ESP instruction adapting in such a way the most prominent findings in this vein. As mentioned earlier, several investigators (Winograd and Hare, 1988; Duffy et al., 1988; and Grant, 1994) agreed on that three significant stages underpin reading strategy instruction, namely: explanation and orientation, modelling and scaffolding, and then application and evaluation. Furthermore, three forms of knowledge have to be emphasised in each stage. These forms of knowledge consist of declarative knowledge (what to know), procedural knowledge (how to know), and conditional knowledge (why to know). Relevant to this, critical reading strategy instruction in the ESP context of the present study has been based on the following aspects: students' prior knowledge activation, strategy identification, modelling, practice, scaffolding, participation, reflection, and further practice. It is worth noting that these procedures also require reviewing previously learnt strategies before a new one is introduced.

For a better illustration of how critical reading strategies were integrated into ESP instruction at ENSH, model lessons are shown below:

I.   Planning Phase:

1. Planning Strategies/Previewing

Introduction:

This lesson is mainly aimed at raising your awareness of critical reading planning strategies before reading a scientific document in English.

Objectives: By the end of this lesson you should be able to:

- Identify your goal and objectives of reading to increase your motivation towards reading.
- Preview the doc to predict its main topic.
- Preview the doc to find out its relevance to your reading goal and objectives.

Materials:

- Text 1: Water and Civilization
- Worksheet 1: planning strategies/previewing
- **Planning strategies: what, why, and how?**

The critical reading activity is a process that is composed of three significant phases: *planning phase, interpretive phase, and critical/evaluative phase*. Each phase has a set of strategies that the critical reader should be aware of and use effectively in order to get the maximum benefit from the read material or text. For instance, the planning phase consists of the following strategies: setting a purpose for reading (goal and objectives), previewing, and schema-activation.

What does it mean planning strategies?

It means a set of strategies that the critical reader adopts before reading a document. These strategies help the reader to plan for the reading activity which may facilitate for him the reading process and benefit as much as possible from the material. This undoubtedly will entail an increase in the readers' motivation and interest towards reading; that is why these strategies are important.

Practice (how to plan for your reading):

- First of all, you should have a purpose for reading. For example, your purpose can be revising for the exam, doing a test, or learning about a new topic ... etc.
- Let's say your purpose is doing a research paper about any topic in the field of hydraulics (you can select a topic from the list provided to you or suggest any other new topic but always in your field of study: hydraulics).
- Now that you know why you are going to read, try to select some documents that relate to your research paper and start the planning phase of the critical reading by following these strategies:

- **Previewing**:

This means having a look at the format of your document before starting reading it. In other words, you should check: titles, subtitles, number of pages, organization of paragraphs, use of figures, pictures, tables, diagrams, charts, ...etc. In such a way, you are creating kind of an image about the doc in your mind which is so important in facilitating the reading practice.

Task 01: While previewing try to answer these questions:

- *What do you notice about this text?*
- *Do you see any headings, charts, or key words that give information?*
- *Does this remind you of anything else you know or have learned about?*
- *What do you think you will learn from this text?*

Task 02: After answering these questions try to complete **worksheet 1- Planning strategies/Previewing (Appendix...)**

Note: tasks 01 and 02 should be done with text 1 and 2

2. Schema-activation Strategies/Predicting/Brainstorming/Mind Mapping

Introduction:

The primary aim of this lesson is to raise students' awareness of schema-activation strategies for example brainstorming, predicting, and use of background knowledge in reading to promote their critical reading of scientific documents in English.

Objectives:

By the end of this lesson students should be able to:

- *Brainstorm/externalize ideas that they already know about the topic of the text.*
- *Make a list of predictions they would like to confirm in the text.*
- *Make a list of what they do not know about the topic and they would like to learn from the text.*
- *Use surface features and organizational clues to identify genre of the text (descriptive, expository...etc.)*
- *Distinguish between their background knowledge and the new information found in the text.*
- *Check the text content against their predictions.*
- *Identify key vocabulary related to a given topic.*

Materials:

- **Text**: History of water from ancient civilizations to modern
- **Worksheet 1**: Mind maps
- **Worksheet 2**: "30-second expert"
- **Worksheet 3**: "Vocabulary awareness chart"

Schema-activation: what does it mean? Why is it important?

Schemata (singular schema) are sets of knowledge and experiences that people use to interpret and make sense of newly learnt information. Schema-activation is a way of linking previous knowledge to new information to help understand and retrieve that information later on which is a focal point in the reading activity as a process of building knowledge. This strategy is beneficial to raise students' motivation towards the reading activity. It can also reduce their anxiety and even confusion when confronted with new information. For instance, students may be asked to make a list of chemical changes in everyday life to activate their schemata and build background knowledge before doing a science experiment.

Schemata can be activated through brainstorming, predicting, questioning, etc.

Practice:

Task 01: Mind Maps (Brainstorming)

Try to brainstorm and share anything you know about the topic in the centre of the mind map below. You can add more ideas and/or questions as branches off the centre of the map.
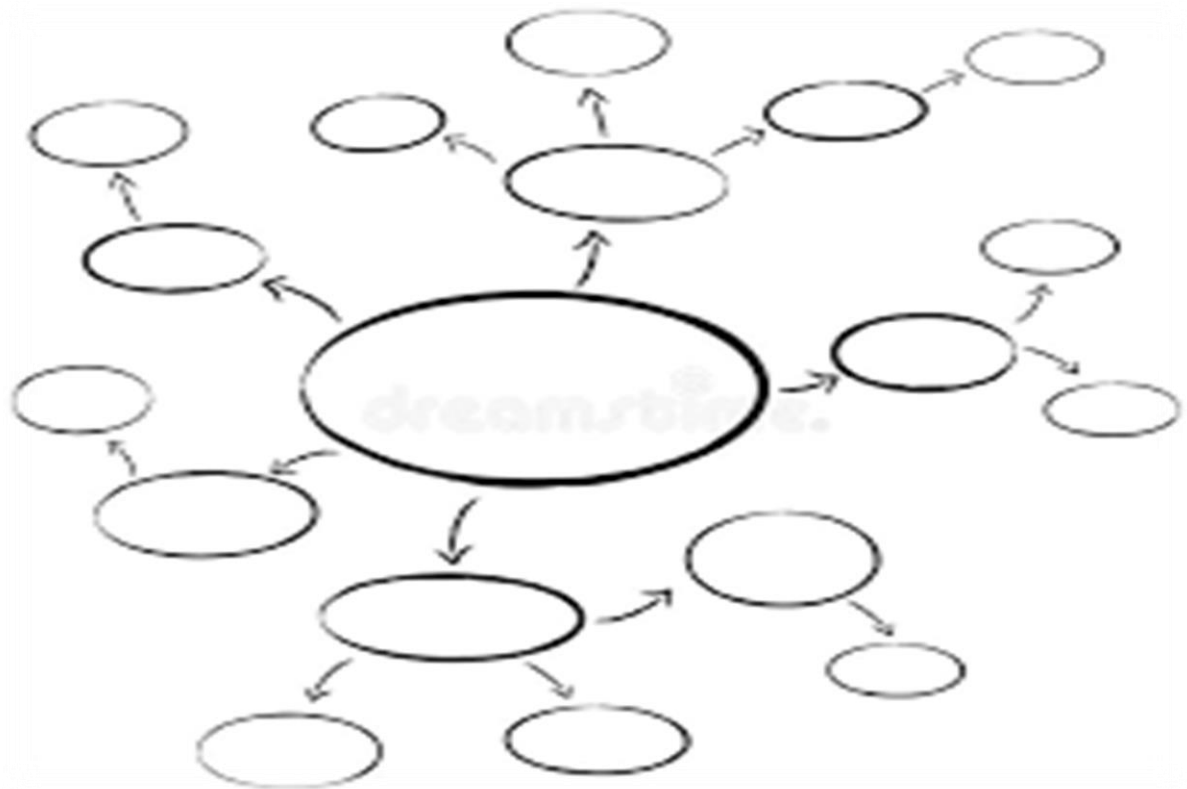
Figure 4.2.: Mind Mapping

Task 02: Make predictions about the text by answering the questions below:

Predicting the main idea	
Read the title of the text and make predictions about the main idea. What will this text be about?	
Now, read the first and last paragraphs. What do we know about the text that we didn't know before?	

Compare your predictions to the information found in the text (true/false).	
Predicting the Genre	
What do you know about this genre?	
How will the text be organized and developed?	

Task 03: 30-second Expert (adapted from LeMaster, 2011)

LeMaster, J. (2001). Critiacl Reading: Deep Reading Strategies for Expository Texts, Teacher Guide. AVID Press

To complete this task, take a few minutes to fill in the left column, "what do I know about this topic?" once you have written all that you know about the topic, follow the steps below.

Step 1: Stand and find a partner. Stay standing.

Step 2: One person shares his or her thoughts while the other listens. You have 30 seconds to share. Begin by saying, "I am an expert on this topic because I know …"

Step 3: The listener will summarize what she or he has heard. Begin your summary with "According to" (insert name) and summarize what you heard. After your summary, ask, "Did I get that right?"

Step 4: Reverse roles. Speaker becomes listener and listener now speaks.

Step 5: Be sure to thank your partner when you finish.

Step 6: Record any new knowledge in the right column.

Topic:……………………………………………………………………………………………

Partner's name:……………………………………………………………………………….

What do I know about this topic?(before reading the text)	What new knowledge or understanding have I gained from listening to my partner? (before reading the text)
…………………………………………....... ………………………………………….. ………………………………………….. ………………………………………….. …………………………………………	………………………………………………… ………………………………………………… ………………………………………………… ………………………………………………… …………………………………………………

Task 04: Building Vocabulary (Vocabulary Awareness Chart)

1. Scan the title, subtitles, captions, reading aids, and first and last paragraphs. Identify ten words that seem important (for instance words that are important to the topic, content vocabulary, or key concepts). Once you have identified these words, write them in the "Word" column. Use a dictionary to look up the words you have never met before.

Word	Definition in your own words
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

2. Select 5 words and use them in meaningful sentences

………………………………………………………………………………………………………

………………………………………………………………………………………………………

II.   Interpretive Phase:

1. Questioning and Inferring Strategies:

Introduction:

This lesson is principally targeted towards raising students' awareness about questioning and inferring strategies while dealing with scientific documents in English, especially before and during the reading process to be able to identify major ideas of a topic.

Objectives:

By the end of this lesson students should be able to:

- Raise/form questions from headings and sub-headings
- Predict the upcoming information
- Keep questioning while reading
- Infer the major ideas of the topic from titles or first sentences of each paragraph
- Infer implicit information especially when it is crucial to your understanding

Materials:

- **Text 01:** Classification of Engineering Soils
- **Text 02:** Water Storage and movement in Soil
- **Worksheet 03**: Vocabulary Awareness Chart

As mentioned previously, reading with questions in mind or questioning yourself while reading will enable you, apart from saving your time, to:

- Find out how ideas relate (or not) to each other
- React intelligently about the structure of the text
- Think logically about the strength of the writer's argument
- Advance your ability of perception as a critical reader
- Remember the content and retrieve information after reading

Asking the Right Questions and Making Inferences:

Asking the Right Questions:

The critical reader has to be able to practice self-questioning while reading and has to learn how to ask the right questions as well. Here are some examples:

- Without reading the whole passage, just from the heading and sub-headings, try to ask yourself:

• Are there any unfamiliar words/expressions?

• What kind of information will be provided by the author?

- Formulate questions to identify key words

• What are the key words (words which are repeated, in bold face/italics, unfamiliar, etc.) and how do they relate (or not) to each other?

- Predicting the author's arrangement of ideas

• While reading the title and sub-titles ask yourself: How does the author arrange the ideas of the text? Why are the ideas arranged in such way? Does this arrangement facilitate understanding pieces of information?

Making Inferences:

The ability of making inferences or reading between the lines is a characteristic feature of critical readers. Inferences can be made about text structure, main and sub-ideas, implicit information/meanings, etc.

Practice

Task 01: Have a look at text 1! Without reading the whole text, try to raise some questions about: title, sub-titles, arrangement of ideas, key words.

Task 02: considering already mentioned elements of the text, try to provide answers to the following questions:

a. Just from the title, say whether you have any information about the topic or not.

b. Mention some words that you find unfamiliar or new for you.

c. Can you predict the key words of the text from the title, subtitles, etc? How do these key words interrelate?

d. What do you think will be the upcoming information?

e. Can you predict the writer's arrangement of ideas?

Task 03: Building vocabulary (**worksheet 03: Vocabulary Awareness Chart**) (Appendix...)

Task 04: Choose the best answer for each of the following questions:

1- What do you think is the author's purpose for writing this text?
2- Who is the intended audience of the author?
3- Which of the following can best reflect the main idea of paragraph....?
4- Which sentence is least relevant to the main idea of paragraph...?
5- Which of the following summarizes the main points of the text?
6- Which of the following statements has no relationship with the topic?
7- Which of the statements below expresses fact not opinion?

Further reading: What are soils?

2. Annotating Strategies

Introduction:

This lesson is principally targeted towards raising students' awareness about annotating strategies while dealing with scientific documents in English, especially during the reading process.

Objectives: By the end of this lesson students should be to:

- Mark/annotate the text
- Write notes and questions in the margins
- Look up unfamiliar words/ expressions and define them in own way
- Paraphrase author's ideas in own words in the margin

Materials:

- **Video**: the teacher can choose any video that relates to the students' study field
- **Text 1**: Why do we build dams?
- **Text 2**: Dam engineering in Algeria

What is annotating?

Annotating is a way or strategy of marking the most significant parts of a text to help understand the content and recall information after reading. In doing so, readers are supposed to respond actively in order to be able to comprehend the text. Annotating urges readers to notice unfamiliar words, differentiate main and supporting ideas, paraphrase author's ideas, and write notes and

questions in the margins. This strategy of critical reading promotes concentration during reading, hence improvement of comprehension. Furthermore, annotating prepares readers for text analysis and synthesis of ideas that can be utilized later on in written tasks like summaries.

How to annotate?

There are mainly two ways of annotation: graphic and written[35]. Graphic and written annotations are more significant when used together, especially in critical reading. Besides graphic and written annotations, readers can also develop their own annotating ways or techniques. Moreover, each developed symbol should be used to refer to a certain meaning. However, while annotating, readers have to:

- Underline the right amount of information
- Develop consistent annotating style
- Annotate accurately

Annotating Sample: (appendix ...)

Practice:

Text 01: Evolution

Text 02: Ecology of wetland ecosystem

Task 01: Preview text 01

Task 02: Worksheet (Mind maps)

Task 03: Worksheet (30-second expert)

Task 04: Try to annotate the first paragraph of text 01 following the steps provided in the lesson. You can use your own symbols but you have to remember the key to your annotation (what every symbol means)

Task 05: Annotate the whole text

Further practice: Do the same tasks with text 02

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[35] For more details about these two ways of annotation check chapter three.

3. *Analyzing Strategies*

Introduction:

This lesson is principally targeted towards raising students' awareness about analyzing strategies while dealing with scientific documents in English, especially during the reading process.

Objectives: By the end of this lesson students should be able to:

- Critically analyze the logical link between ideas and visual aids
- Identify the organizational aspects of a text (compare/contrast; cause/effect, etc.)
- Analyse to distinguish fact from opinion
- Take notes to understand and remember information
- Outline author's presentation of information or argument
- Summarize sections of interest

Materials:

- **Video**: Choose any video that relates to the students' study area
- **Text 1**: Biodiversity and ecosystem stability
- **Text 2**: Causes and consequences of biodiversity declines

Strategies of scientific text analysis

The most important analysis strategies the critical reader of a scientific text has to know are the following:

- Defining unfamiliar words in own style using contextual clues
- Paraphrasing author's ideas
- Distinguishing main ideas from sub-ideas
- Distinguishing fact from opinion
- Interpreting the link between ideas and visual aids
- Identifying organizational aspects of the text in terms of (comparison/contrast; cause/effect; problem/solution; etc)
- Summarizing sections of interest

Practice:

Task 01: Preview text 01

Task 02: Try to annotate paragraphs 1, 2, and 3

Task 03: Choose the best answer for each statement (statements should be about: paraphrasing author's ideas; distinguish main and sub-ideas; distinguish fact from opinion; interpret the link between ideas and visual aids)

Task 04: Identifying organizational aspects of the text (compare/contrast; cause/effect; problem/solution; chronology/sequence; etc) using graphic organizers.

Task 05: Outlining author's presentation of information or argument

Task 05: summarize parts of the text you consider important.

Further practice: Do the same tasks with text 02

III. Interpretive Phase
1. Self-regulation Strategies

Introduction:

This lesson is principally targeted towards raising students' awareness about self-regulation strategies while dealing with scientific documents in English, especially during the reading process.

Objectives: By the end of this lesson students should be able to:

- Tolerate ambiguity and confusion in the first reading
- Clarify ambiguities through re-reading and ongoing questioning or seek help from someone else (e.g. classmate, language teacher, or subject specialist teacher)
- Be aware of which strategy fits which context
- Try to explain or share what you have learnt with others

Materials:

- **Video**: select a video that relates to the students study area
- **Text 1**: Agriculture and human society
- **Text 2**: The influence of soils on human health

Self-regulation strategies: what and how?

Self-regulation refers to the ability to monitor or control one's actions, thoughts, and feelings during a given task, for example reading, in order to increase motivation towards achieving a predetermined goal. Therefore, self-regulation strategies like: ambiguity and confusion tolerance

in the first reading, rereading to avoid ambiguity, as well as awareness about which reading strategy fits which context, are highly required to promote and facilitate the critical reading process.

Practice:

Task 01: Environmental structuring

Listen to your environment, what distract you? How can you change the situation for better?

Distracts	I can adjust it by ...	I should tolerate it.
1. People whispering		
2. Noise from outside the room		
3. Your thoughts		
4. Others:...........................		

Task 02: preview the text

Task 03: Dealing with ambiguities and confusion.

Read the text twice, and then answer the following questions

1. How was your first reading of the text?
2. How was your second reading of the text?
3. Have you faced any ambiguities in your first and second reading? What did you do to remove these ambiguities?

Task 04: Seeking help (Social assistance)

Which of the following ways did you use or would you like to use to remove ambiguities in the previous task? Please specify them.

Ways	I tried this way to ...
Guessing	
Surfing the net	
Asking someone else (teacher, friend, etc.)	

Re-reading	
Consulting a dictionary	
Other:	

Task 05: memorizing new information

Which strategy would you like to use to memorize/remember newly learnt information?

Strategy

Paraphrasing

Drawing graphic organizers

Taking notes

Outlining

Summarizing

Sharing ideas with others

Task 06: Self-evaluation

Evaluate yourself through answering these questions.

1. How much did you get the text? 100%   50-100%   less than 50%
2. Which task helped you more to deal with the text?
3. Have you done the tasks correctly? All of them   most of them   some of them
4. How was your performance in general? Very well   satisfactory   not satisfactory
5. How do you score yourself from 1 to 20?
6. Is there anything else you would like to add about your performance? Please specify.

2. Evaluation Strategies

Introduction:

This lesson is principally targeted towards raising students' awareness about self-regulation strategies while dealing with scientific documents in English, especially during the reading process.

Objectives: By the end of this lesson students should be able to:

- Compare content of the text with their predictions.

- Comparing texts dealing with the same topic.

- Give their own interpretation of the author's ideas.

- Evaluate the author's arguments and evidence.

- Try to find knowledge gaps for further investigation/reading.

Materials:

- **Video**: teacher's or student's choice
- **Text 1**: Global climate change
- **Text 2**: What happens after global warming?

Evaluation strategies:

There are some strategies that the critical reader has to possess in order to be able to evaluate a text/document. These evaluation strategies:

- Comparing text content to predictions

- Comparing texts on the same topic

- Interpreting author's ideas

- Evaluating author's arguments and evidence

- Finding knowledge gaps

Practice:

Task 01: preview text 1 (worksheet)

Task 02: Annotate the text (annotating strategies

Task 03: Analyse the text through:

- Finding the main idea and its supporting details for each paragraph (use outlining)

- Define key words in your own way

- Interpret relationship between ideas and visual aids

- Summarize the main points of the text

Task 04: Compare your predictions before reading to the text content after reading the text

Predictions	Right	Wrong
1.		

2.		
3.		

Task 05: Comparing texts dealing with the same topic (worksheet)

Task 06: (interpreting author's ideas + evaluating author's argument/evidence+ finding knowledge gaps)

Give answers to the following questions:

1. What do you think is the author's purpose for writing this text?
2. What does the author want you to think or believe?
3. What reasons or evidence does the author provide to support his/her argument?
4. Does the author provide sufficient evidence to support his/her argument?
5. Is the author's evidence relevant to the issue presented?
6. What are the other important aspects of the topic that have not been mentioned by the author?

IV.2.2.4. Fostering Students' Motivation:

Motivation plays a vital role in promoting students' critical reading strategies in the ESP classroom. It is the fuel that can boost students' interest in their course. Without motivation they cannot show enthusiasm towards what their teacher is attempting to provide them with. Therefore, success in using critical reading strategies properly is tightly linked and heavily relies on the extent to which the students are motivated and interested in what is taught to them. That is why it is indispensible that when integrating critical reading strategies in to ESP instruction, teachers are recommended to take into account the importance of the different ways that may help foster their students' motivation towards every aspect of the proposed course.

In this vein, teachers' attention can be drawn to Dornyei's conception of motivation and the different motivational techniques and strategies that can help them enhance their students' interest. According to Dornyei (2001) since motivation is related to human behaviour, motivational strategies refer to those "motivational influences that consciously exerted to achieve some systematic and enduring positive effect" (p.28). Relevant to this, promoting students' motivation in the foreign language classroom requires language teachers to adopt some

components of motivational teacher practice as supposed by Dornyei (ibid., p. 29). These components include:

1. Creating the basi motivational conditions:
- Appropriate teacher behaviour
- A pleasant and supportive atmosphere in the classroom
- A cohesive learner group with appropriate group norms

2. Generating initial motivation:
- Enhancing the learners' L2-related values and attitudes
- Increasing the learners' expectancy of success
- Increasing the learners' goal-orientedness
- Making the teaching materials relevant for the learners
- Creating realistic learner beliefs

3. Maintain and protecting motivation:
- Making learning simulating and enjoyable
- Presenting tasks in a motivating way
- Setting specific learning goals
- Protecting the learner's self-esteem and increasing their self-confidence
- Allowing learners to maintain a positive social image
- Creating learner autonomy
- Promoting self-motivating strategies
- Promoting cooperation among the learners

4. Encouraging retrospective self-evaluation:
- Promoting motivational attributions
- Providing motivational feedback
- Increasing learner satisfaction
- Offering rewards and grades in a motivating manner

The motivational aspects proposed by Dornyei are highly appreciated and recommended for ESP teachers to apply while integrating critical reading strategies into ESP instruction. These aspects are too comprehensive as they take into consideration every detail of the language classroom including, the teacher, the learner, and the language classroom atmosphere. Nevertheless, teachers can even consider aspects that perhaps are particular to their teaching contexts or adapt those provided by Dornyei.

All in all, teachers should not come in the class and give instructions only, but they should as create an agreeable atmosphere that is likely to increase their students' motivation and enhances their interest in the taught material. This agreeable atmosphere, in fact, has to be encouraged from the beginning of the academic year through integrating students into the process of course design. In that, students can take part in suggesting course objectives and selecting the reading material to be treated in the classroom. They can also be given the opportunity to choose how to work in the classroom and suggest which tasks they prefer to do individually, which they like to do in pairs, and which ones to practice in group/team work. This would certainly increase the student's self-esteem as active agent in the language classroom. They will even feel more enthusiastic towards their English course, and for sure they will always anxiously wait for meeting their English teacher in the coming session. This is one way to create a positive atmosphere for promoting critical reading strategies among ESP students, and this is what has been adopted when conducting this study at ENSH.

Lastly, it can be concluded that for increasing students' interest and motivation, the teacher should attempt to implement some pedagogical practices deemed significant for fostering students' integration and heighten their motivation towards the course. Some examples of these practices include: negotiating course aspects with the students, integrating students in the selection of readings, encouraging classroom discussion, and collaborative work, among others.

IV.2.3. Students' Role to Become Critical Readers:

Promoting students' critical reading strategies necessitates their active engagement in the learning process. In fact, the fundamental role that students play in order to achieve an effective integration of critical reading strategies in ESP instruction cannot by any means neglected or denied. The efforts made by teachers alone would not result in positive outcomes unless their students are as well interested and actively take part throughout the whole process of critical reading strategies integration. For doing so, students are also addressed in this section of recommendations through highlighting some learning aspects that they have to wisely pay attention to in order to be able get the maximum benefit from their critical reading course, hence to develop as critical readers. Relevant to this, self-confidence, motivation, and interaction are three significant elements deemed characteristic features of successful critical readers.

- **Self-confidence:**

Self-confidence is generally defined as someone's trust or belief in his/her abilities in doing something successfully. So, it is that internal feeling that things will go well while doing a particular activity. In this vein, self-confidence is often viewed as a set of beliefs about one's talents and capabilities (Larwrence, 2006). As such, self-confidence is that personal factor which plays an active role in foreign language learning achievement. That is why many researchers confirmed that language learning tasks cannot be efficiently put into effect without the variable of self-confidence.

Relevant to this, when students have a low level or lack of self-confidence, they will feel unable to proceed effectively in throughout the process of language learning. This kind of students is always timid and fearful to participate, especially in group work and activities because they are often reluctant to express themselves overtly as they usually expect failure. However, students with high self-esteem and strong confidence are always eager to take part in classroom activities. These students are certainly sure of their capacities as they are at all moments do efforts and get highly involved in the process of EFL learning. So, these students believe in themselves and their skills that they are capable to do even difficult things.

Therefore, it is so obvious that there exist a strong relationship between self-confidence and foreign language learning. This means that success in EFL can also be determined by being self-confident. As such, students who possess a high level of self-confidence always reveal better achievements in language learning skills than those with a low level of self-confidence. Consequently, students must be aware of the importance of trusting themselves as language learners. Thus, without self-confidence, students will be unable to progress as competent learners of the English language in general and the reading skill in particular.

The same thing can be applied for the context of critical reading development. With reference to the present study, once introduced to the notion of critical reading and critical reading strategies, ESP students at ENSH were totally astonished and confused. They were asking the teacher researcher "How can we as students criticize something written by an author of a high level?" They were also asking "Do we have the right to criticize author's work?" So, they were not even aware that as university students they must develop such competences of analysing, criticizing, and evaluating everything they read because this is the first step towards scientific research. In fact, such a feeling of low-self-esteem emanates from past experiences and

negative learning habits. In that, traditional ways of teaching EFL were basically emphasizing vocabulary instead of understanding, constructing, and reconstructing meaning.

Therefore, ESP students, especially in Algerian context are recommended to believe in themselves and their capacities. They should bear in their minds that success in learning English is particularly based on the level of their self-confidence. Similarly, students are required to behave confidently in order to be able to develop their higher order thinking skills. In this vein, students must also be conscious about the fact that their teachers cannot do everything for them, and that they are first responsible for developing their language skills, especially critical reading. Consequently, to be able to promote as critical readers, students must have to increase their self-confidence first.

- **Motivation:**

As it has already been mentioned, motivation is among the several factors that help learners pursue their language learning successfully. Meanwhile, though teachers play a vital role in boosting their students' motivation, they should not be thought to be the only responsible for doing that. Students as well have to know that desirable achievement in language learning cannot be attained with the absence of motivation. In the same way, students must know that their critical reading strategies promotion or their progress as critical readers cannot be realized unless they are motivated to become critical readers.

Furthermore, students have to be aware that their motivation towards doing something is strongly linked to the extent they like doing such thing. Thus, when students like what they are studying, their motivation towards their studies will positively be affected and vice versa. They will even be able to face all kinds of difficulties and defeat all sorts of obstacles that may come in their way. As revealed in this study, when students became aware of the notion of critical reading, after the teacher's explanation of course, they liked it and seemed more motivated to learn more about it. Then, after experiencing it, they believed in that they have to keep using it even after the experimental study.

Meanwhile, it is worth noting that motivation is also linked to self-confidence. Students with low self-confidence are likely to show reluctance towards their studies, to be passive and less interested than those with higher level of self-confidence. Therefore, to enhance their self-confidence which may in turn foster their motivation towards critical reading, students have to realize that effective learning exceeds the walls of their classroom; that their teachers are here

just to advise, guide, facilitate, and help them throughout their learning journey. They have also to recognize that their significant role inside and outside the classroom cannot be replaced by anyone else. Thus, to become critical readers, students are required to be highly motivated towards the notion of critical reading in theoretical terms and towards the concept of critical reading strategies in practical terms.

- **Interaction:**

Promoting critical reading strategies among ESP students requires, in addition to what has been revealed above, students' interaction and full integration into classroom practice and activities through participation and collaboration. As put forward by Tsui, classroom interaction signifies "a cooperative effort among participants in which each participant contributes in determining the direction and outcome of the interaction" (1995, p. 06). This means that students' classroom interaction revolves around their active engagement and involvement in the learning process where they are supposed to be eager to construct their own ideas and able to share their opinions within a positive atmosphere that encourages participation and collaboration. So in the critical reading classroom ESP students have to interact with their teacher, partners, and even the tasks given to them through different ways.

Participation, for instance, is one way to interact in the critical reading classroom. In this context, interactive verbal participation is so significant and essential. For doing so, students are expected to share their ideas in the critical reading setting with their teacher and classmates. They should participate in the discussion of the reading material and the negotiation of its deep meaning. In other words, they are supposed to effectively express and clarify their thoughts, beliefs, intentions, and opinions.

Not only this, students' participation may transcend verbal expression of their thoughts to include other elements of the critical reading experience. In that, they can be encouraged to take part in negotiating the objectives suggested by their teacher and why not proposing others since the course is based on fulfilling their needs as far as the English language learning is concerned. Students can also participate in the process of selecting and evaluating teaching materials, especially in what concerns topics and texts chosen for treatment in the reading classroom. Even classroom tasks and activities can be discussed with the students through adapting some and suggesting new ones they judge necessary to promote their critical reading abilities. Proceeding in such way would undoubtedly create so far a positive atmosphere wherein participation can be further developed into collaboration.

Collaboration, on the other hand, is validated as an effective way to enhance ESP students' critical reading skills. For this, students are recommended to take the initiative to collaborate and work together both inside and outside the classroom. Students can collaborate through working in pairs or through group work. This would help them a lot to exchange ideas and expertise in terms of using critical reading strategies. They can even exchange or share their learning experiences so that to improve their way of learning. Therefore, it is deduced that collaboration is a significant way to sharpen the capacities of good readers and help to increase the abilities of those who are generally weak readers. It may also ameliorate self-confidence and motivation among the students as it gives them the opportunity to express their ideas to each other. Collaboration can be with the teacher as well in what concerns solving problems of learning in the classroom or helping the teacher in modelling a given strategy to low ability students.

Eventually, it can be deduced that the responsibility of promoting critical reading abilities and strategies among ESP students should not be taken by the teacher only. Students are also responsible for their learning, so they must take part in the process of acquiring critical reading strategies. Moreover, they are highly required to stop thinking of their teachers as fountains of knowledge, the only available source of information, or as the only one who can make succeed or fail. Instead of thinking in such a way, students should change their learning behaviours, thoughts and beliefs. They must be aware that motivation, self-confidence, and interaction through participation and collaboration are indispensible features that they have to adopt in order to promote their critical reading strategies and behave as critical readers.

Conclusion:

In the light of the obtained results, the last chapter tried to provide some suggestions and recommendations in order to help students promote their critical reading abilities in the ESP classroom. For this, recommendations were first addressed to authorities and policy makers to rethink ESP teaching in the Algerian context through re-enhancing the Algerian ESP project, and fulfilling the need for a national university level ESP course that has to cope with 21st century higher education requirements, especially in terms of determining clear objectives of ESP teaching. Policy makers' attention was also drawn to the significance of pre-service and in-service ESP teacher training in order to enhance teachers' qualifications and professional development. Similarly, interdisciplinary teacher collaboration was as well found fundamental to be emphasized within this respect.

In the same vein, and at the pedagogical level, administrators were recommended to shift their traditional policies and practices towards adopting a more critical approach to the teaching of ESP. In a similar way, teachers were called to realize their principle role to promote critical reading among ESP students. Relevant to this, they were required to be aware of the process of integrating critical reading strategies into ESP instruction. This process is fundamentally based on: measuring students' critical reading strategies awareness, determining achievable objectives, integrating critical reading strategies, and fostering students' motivation. Yet, even students were concerned with these recommendations through accentuating the prominent role they can play in order to develop as critical readers.

General Conclusion

There is no doubt that the fast growing world changes have created everlasting challenges which affect every human enterprise, and education is not an exception. Technology revolution, on the other hand, has augmented the availability of huge amounts of information coming from different sources and at every moment. Therefore, facing such changes and challenges requires rounded individuals who are able to give judgements to what surrounds them. These judgements have to be based on reflection, logical reasoning, and facts. Thus, individuals have to be able also to read and evaluate things with a critical eye. Meanwhile, the different forms of information found everywhere have to be treated wisely and cautiously. This treatment should go deep into details instead of considering superficial elements only. Yet, this would undoubtedly demand efficient competences that only a well established educational system can provide.

Responding to such situation, higher education institutions worldwide have sought different educational alternatives and tried to bring reforms to existing policies and practices to face the new circumstances imposed by the 'new brave world'. One of these reforms was the LMD system which has introduced new educational rules as far as higher is concerned, highlighting in such way the importance of developing work place competences which favours the 'know-how' instead of the 'know-what', and boosting simultaneously new concepts like mobility and employability. Confronting these realities, a paradigm shift of pedagogical practices has become inevitable. The focus on the learner and the learning process instead of teaching has been coined as the new educational approach in different fields including EFL for specific purposes. The latter has recently leaned towards a more critical perspective than the traditional approaches based on grammar and vocabulary.

In this vein, it has to be spotlighted that the concept of critical reading and the importance of developing students' higher order thinking skills. Traditionally, the ESP classroom was often grounded on selecting a topic that relates to a given field of interest which may or may not respond to the needs of the students. This topic is often presented in a form of a text that has to be read by the students who are then expected to answer a set of comprehension questions that follow the text. After that, some synonyms and opposites, which can easily be found in the text, are proposed. In the best cases, this activity may be followed by mastery of language tasks which deal with grammar (conjugation of verbs, transformation of sentences, the conditional, and so on). Finally, a written expression activity is put by the end to practice the writing skill. This scenario of EFL teaching is maintained in approximately all Algerian higher education

institutions where English is taught for specific purposes like: business, economy, medicine, and hydraulics as it the case of the present research. So, the question that is raised here is how can this scenario of teaching ESP face worldwide changes? Is this scenario effective to teach/learn the first international language of science and technology and of all sources of information?

The answer is certainly 'No'.

As the answer is 'no', and with reference to the current situation of teaching ESP in Algeria in general and at ENSH in particular, the present study has suggested the promotion of critical reading strategies among ESP students. The main purpose was to raise students' critical reading strategies in terms of awareness and use in order to enhance their critical reading abilities to read field related material efficiently. This was also intended to increase students' comprehension of documents written in English as well as to develop their motivation and interest towards learning the English language generally and the reading skill particularly, which would in turn effectively enhance their academic achievement as far as the English language is concerned.

In fact, interest in investigating the possibility of promoting ESP students' critical reading strategies emanates principally from the long teaching experience of ESP by the researcher at ENSH. Moreover, and with regard to reviewed literature in chapters one and two, it was obvious that recent teaching approaches have shifted interest towards a more critical line of thought of ESP pedagogy wherein critical reading of scientific documents is more emphasized than comprehension-based reading. In addition, literature revealed that critical reading has become the salient attribute to 21st century higher education. Accordingly, the promotion of critical reading strategies has become a necessity, especially among ESP students.

Furthermore, as it has been mentioned earlier, the critical reading emphasized in this study was based on different strategies. The latter were organized and categorized into three significant phases that constitute the critical reading process. First, the planning phase includes planning strategies, and schema-activation strategies which in turn include previewing, predicting, and brainstorming. Second, the interpretive phase is composed of questioning and inferring strategies, annotating strategies, and analysing strategies. Third, the critical/evaluative phase revolves around self-regulation strategies and evaluation strategies. Certainly, before being exposed to the practice of these strategies, students were thoroughly introduced to the notion of critical reading and critical reading strategies and their significance in pursuing tertiary education.

Furthermore, and to prove the effectiveness of integrating critical reading strategies into ESP instruction, the present research opted for an experimental study that based on a mixed-methods research design. For this, two groups of first year engineering classes at ENSH were assigned as experimental and control each. The experimental group was explicitly instructed into critical reading strategies whereas the traditional way of teaching ESP was kept with the control group. Moreover, for collecting data three research instruments were opted for, namely: the Critical Reading Strategies Awareness Questionnaire (CRSAQ), a test of critical reading, and reflective journals. Then, gathered data were described and statistically analysed using SPSS version 23. Findings revealed very satisfactory outcomes of the suggested instruction.

Unlike the control group, and thanks to the integration of critical reading strategies into ESP instruction, the experimental group was able to show awareness of critical reading strategies and how to use them while reading specialized material in English. Students in the experimental group have also revealed an increase in their critical reading abilities and were capable to overcome difficulties they used to confront when reading in English. Additionally, the suggested instruction helped students a lot in enhancing their motivation towards learning the English language and the reading skill mainly. These positive effects of explicit instruction in critical reading strategies entailed as well an obvious progress in the students' academic achievement as far as the ESP course is concerned.

On the other hand, it is worth stating that this study represents an original contribution in the field of ESP research, especially in what concerns the development of students' critical reading strategies. In that, besides confirming recent research results about the importance of critical reading in EFL as well as the significance of raising and enhancing language learners' critical reading abilities, the findings of this research also proved that critical reading can be efficiently promoted among ESP students, mainly through raising their awareness of critical reading strategies, and when and how they have to be used. Concomitantly, promoting such awareness entails an increase in students' motivation towards reading, overcoming reading difficulties, and enhancing their academic achievements.

Nevertheless, as the promotion of critical reading strategies among ESP learners has been revealed to be time consuming and requiring the collaboration of all stakeholders in the field, some recommendations were put forward to handle the situation seriously. For this, policy makers and authorities were called to revise their practices towards the Algerian ESP project as this is believed to be the starting point of all possible amelioration of the field. Therefore, this

project is suggested to be re-enhanced through fulfilling the need for a university level ESP course that can respond to local needs ad cope with the requirements and expectations of 21st century higher education, especially in what concerns the objectives of ESP teaching/learning. Moreover, policy makers were recommended to wisely consider pre-service and in-service teacher training and encourage interdisciplinary teacher collaboration for the sake of meeting international ESP teaching qualifications and achieving higher level of professional development.

Moreover, pedagogical implications have also raised the need to address administrative in order to change their traditional policies and practices towards supporting a more critical approach to ESP pedagogy. Similarly, ESP teachers were reminded of their significant role in enhancing their students' critical reading strategies by means of a couple of instructive procedures which are principally based on: measuring students' critical reading strategies awareness, determining achievable objectives, integrating critical reading activities, and fostering students' motivation.

In the same vein, students were as well called to actively take part in the process of progressing as critical readers. For this, students were made aware of the fundamental role of self-confidence in promoting their critical reading abilities. Not only this, motivation and classroom interaction that can be attained through participation and collaboration were also highlighted as indispensible aspects for ESP learners to effectively develop as competent critical readers.

Eventually, it should be noted that, as with any study, there were some limitations. First, the sample selected was taken from the specialty of hydraulics only. Second, conducting the study during one semester only is not found enough to have more reliable results. Third, there was no a follow up of students practice after the instruction. Therefore, acknowledging these limitations would warrant for further research. In that, the study can be conducted within another context taking into consideration different ESP disciplines. Then, it will be better if this research is dealt with as a longitudinal study which would guarantee the credibility of its findings.

To conclude, critical reading is the cornerstone of modern higher education, and has to be reinforced among learners, especially ESP students, through raising their critical reading strategies awareness and use. For how to do so, this study has presented a successful learning experience wherein critical reading strategies have been effectively integrated into ESP instruction and overtly taught to ESP students. Yet, despite its limitations and shortcomings, this

study can be used as an effective resource for ESP practitioners who are interested in the concept of critical reading which should be viewed nowadays as the pillar of a well established ESP pedagogy.

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Appendices

Appendix (A)

ESP Students' Reading Strategies Awareness Questionnaire

(adapted from Mokhtari and Sheory's SORS, 2002**)**

The purpose of this questionnaire is to collect information concerning the strategies you use while reading academic materials in English (e.g. reading examination texts). Each item in the questionnaire is followed by 4 numbers 1, 2, 3and 4, and each number means the following:

"**1**" = 'I **never** do this'; "**2**" = 'I **rarely** do this'; "**3**" = 'I **frequently** do this'; "**4**" = 'I **always** do this'

After reading each statement, circle the number (1, 2, 3 or 4) which applies to you. You should know that there are no right or wrong responses to any of the items of the questionnaire.

N°	Pre-reading Strategies	Scale			
01	I establish a purpose for reading through raising some questions I like to have answered in the text	1	2	3	4
02	I make a list of all ideas I may have about the topic of the text	1	2	3	4
03	I make a list of predictions to anticipate possible content of text	1	2	3	4
04	I look at the text surface features and organizational clues (e.g. titles, subtitles, diagrams, etc.)	1	2	3	4
05	I make some comments on organizational aspects of text (e.g. title, author, source, visual aids, etc.)	1	2	3	4
	While-reading Strategies				
06	I read headings and subheadings, etc. to understand the organization of text	1	2	3	4
07	I keep raising questions in mind about the text	1	2	3	4
08	I skim the text to get the general idea	1	2	3	4
09	I read aloud to concentrate well and understand what I read.	1	2	3	4
10	I try to guess the meaning of difficult words through contextual clues.	1	2	3	4
11	When guessing meaning from context is also difficult, I use translation into Arabic or French	1	2	3	4
12	When translation doesn't help, I ask another person (e.g. classmate, English teacher, subject specialist)	1	2	3	4
13	I read slowly and carefully when looking for specific information	1	2	3	4
14	I connect what I read to what I already know while reading	1	2	3	4
15	I annotate and mark the text while reading	1	2	3	4
16	I summarize the general idea of each paragraph in written form	1	2	3	4
17	I look for logical relationships between paragraphs.	1	2	3	4
18	I look for logical relationships between paragraphs and visual aids (e.g. diagrams…)	1	2	3	4
19	I identify main idea and supporting details of each paragraph.	1	2	3	4
20	I identify the organizational aspects of text in terms of its typical structure (e.g. cause/effect, compare/contrast, etc.)	1	2	3	4
21	I verify my understanding of text with classmates or teacher.	1	2	3	4
22	I control my understanding of text by identifying topic sentences of paragraphs or inventing topic sentences if none exist	1	2	3	4
23	I take notes while reading to understand what I read.	1	2	3	4
24	I re-read text to check my understanding	1	2	3	4
25	I examine ideas to make difference between fact and opinion	1	2	3	4
	Post-reading Strategies				
26	I check if my predictions about the text are right or wrong	1	2	3	4
27	I examine how well text is understood through discussion with classmate, English teacher,	1	2	3	4

	subject specialist				
28	I make critical comments on text	1	2	3	4
29	I re-read to summarize the text	1	2	3	4
30	I check if the questions raised at the beginning are answered in the text	1	2	3	4
31	I check to what extent my purpose of reading is fulfilled	1	2	3	4
32	I make a list of new words and terminology to learn and build vocabulary	1	2	3	4

ESP Students' Reading Strategies Awareness Questionnaire

Scoring Rubric

1. Write your response to each statement (e.g. 1, 2, 3, 4 or 5) in each of the blanks below.
2. Add up the scores under each column. Place the result on the line under each column.
3. Divide the score by the number of statements in each column to get the average for each subscale.
4. Calculate the average for the survey by adding up the subscale scores and dividing by 32
5. Compare your results with those shown below.

Pre-reading Strategies	**While-reading Strategies**	**Post-reading Strategies**
(Pre-R Subscale)	(While-R Subscale)	(Post-R Subscale)
1/…………...	6/……… 7/………...	26/……………...
2/…………...	8/……… 9/………...	27/……………...
3/…………...	10/…… 11/………...	28/……………...
4/…………...	12/…… 13/………...	29/……………...
5/…………...	14/………15/……….....	30/……………...
	16/………17/……….....	31/……………...
	18/………19/………... .	32/……………...
	20/………21/………	
	22/………23/………	
	24/………25/………	

Pre-R Score ………   While-R Score…………   Post-R Score……...   **Overall Score**…….

Pre-R Mean………   While-R Mean………….   Post-R Mean………   **Overall Mean**…….

Key to Averages: 3.5 or higher = High   2.5 – 3.4 = Medium   2.4 or lower = Low

ESP Students' Critical Reading Strategies Awareness Questionnaire

The purpose of this questionnaire is to collect information concerning the strategies you use while reading academic materials in English (e.g. reading examination texts). Your answers will be anonymous and confidential.

1. **Students' profile**
   a. Gender:……
   b. Age:……
   c. Years of studying English: …….
   d. How do you perceive your level in English: Poor ☐ Fair ☐ Good ☐ Excellent ☐
2. **Students' attitudes and motivation towards reading in English**
   a. Do you like studying English? Yes ☐   No ☐
   b. How important for you to read in English?
      Very important ☐   Important ☐   Not important ☐
   c. Do you think critical reading of scientific documents is necessary for you?
      Yes ☐   No ☐
   d. Do you like your teacher to show you how to read critically?
      Yes ☐   No ☐
3. **Students' reading difficulties**
   a. Do you have difficulties in reading in English? Yes ☐   No ☐
   b. Which kind of difficulties do you encounter when reading texts in English?
      Vocabulary ☐   Grammar ☐   Comprehension ☐
      Analysis ☐   All of them ☐   Nothing ☐
   c. Which of the following do you consider the main reason for these difficulties?
      Lack of reading ☐   Way of reading (don't know how to read) ☐   Other (precise): ………
4. **How often do you use each of the following strategies when you read in English for academic purposes?** After reading each statement, circle the number (1, 2, or 3) which applies to you. There are no right or wrong responses to any of the items of the questionnaire. Each item in the questionnaire is followed by 4 numbers 1, 2, 3and 4, and each number means the following:

"**1**" = 'I **always** do this'; "**2**" = 'I **sometimes** do this'; "**3**" = 'I **never** do this'

N°	Critical Reading Strategies	Scale		
01	I identify my goal and objectives to increase my motivation to read	1	2	3
02	I preview the document to find out its relevance to my reading goal and objectives	1	2	3
03	I brainstorm/externalize ideas that I already know about the topic of the text	1	2	3
04	I use surface features and organizational clues to identify the genre of the text (descriptive, expository...etc.)	1	2	3
05	I make a list of predictions I would like to confirm in the text	1	2	3
06	I make a list of what I do not know about the topic and I would like to learn from the text	1	2	3
07	I distinguish between my background knowledge and the new information found in the text	1	2	3
08	I check the text content against my predictions	1	2	3
09	I raise/form questions from headings and sub-headings	1	2	3
10	I predict the upcoming information	1	2	3
11	I keep questioning while reading	1	2	3
12	I infer the major ideas of the topic from titles or first sentences of each paragraph	1	2	3
13	I try to infer implicit information especially when it is crucial to my understanding	1	2	3
14	I mark the text through underlying and/or circling important words and	1	2	3

		1	2	3
	information			
15	I look up unfamiliar words/expressions and define them in my own words	1	2	3
16	I use my own words to paraphrase the author's ideas in the margins	1	2	3
17	I distinguish between main ideas and supporting ideas (identify topic sentence and supporting sentences)	1	2	3
18	I write notes and questions in the margins	1	2	3
19	I critically analyse the logical link between ideas and visual aids (tables, graphs, diagrams...)	1	2	3
20	I identify the organizational aspects of the text in terms of its typical structure (compare/contrast, cause/effect,...etc)	1	2	3
21	I critically analyse ideas to distinguish fact from opinion	1	2	3
22	I take notes while reading to understand and remember what I read	1	2	3
23	I outline author's presentation of information or argument	1	2	3
24	I summarize sections of interest	1	2	3
25	I tolerate ambiguity and confusion in the 1st reading	1	2	3
26	I try to clarify ambiguities through re-reading and ongoing questioning or seek help from someone else (e.g. classmate, language teacher, or subject specialist teacher)	1	2	3
27	I am aware of what strategy fits what context	1	2	3
28	I try to explain or share what I have learnt with others	1	2	3
29	I compare content to my own predictions (true/false)	1	2	3
30	I compare the text to other documents dealing with the same topic	1	2	3
31	I give my own interpretation of the author's ideas	1	2	3
32	I evaluate the author's arguments and evidence	1	2	3
33	I try to find knowledge gaps for further investigation/reading	1	2	3

Scoring Rubric

6. Write your response to each statement (e.g. 1, 2, or 3) in each of the blanks below.
7. Add up the scores under each column. Place the result on the line under each column.
8. Divide the score by the number of statements in each column to get the average for each subscale.
9. Calculate the average for the survey by adding up the subscale scores and dividing by 35
10. Compare your results with those shown below.

Strategies	Planning Phase		Interpretive Phase			Evaluative Phase	
	PS	SAS	QIS	AS	AS	SRS	ES
Response	1. … 2. …	3. … 4. … 5. … 6. … 7. … 8. …	9. … 10. … 11. … 12. … 13. …	14. … 15. … 16. … 17. … 18. …	19. … 20. … 21. … 22. … 23. … 24. …	25… 26… 27… 28…	29… 30… 31… 32… 33…
Subscale Scores	…….../2	…..…../6	………../5	………../5	………../6	………../4	………..../5
Mean	………..	………...	………....	………….	………….	………….	………….

Overall score: …………./33

Overall mean:……………..

Key to Averages: 2.5 or higher = High	**1.5 – 2.4 = Medium**	**1.4 or lower = Low**

Suggestions:………………………………………………………………………………………………………

……

………

Critical Reading Test

Read the passage below; then answer the questions that follow.

Recent atmospheric studies have shown that constantly increasing levels of carbon dioxide and other gases are capable of raising the earth's average temperature. Although no one is certain how serious global warming may become, the threat can no longer be ignored. The best way to reduce these gases is to make consumers pay the full environmental costs of various energy sources. The greater the amount of pollution a given energy source generates, the higher the consumer price should be. In addition to curtailing the use of environmentally destructive power sources, a program based on such marketplace incentives would spur efforts to develop less harmful alternatives.

1. *What is the passage about?*
   ……………………………………………………………………………………………
2. *The writer of the passage relies mainly on which of the following persuasive techniques?*
   a. Using examples
   b. Appealing to emotion
   c. Anticipating counterarguments
   d. Appealing to logic
   e. Citing respected authorities

3. *Which of the following assumptions most influenced the writer's argument in the passage?*
   a. Global warming is the greatest threat facing humankind today.
   b. Consumers tend to seek out inexpensive alternatives to expensive products.
   c. Most people spend too much money meeting their energy needs.
   d. Scientists know much more about the effects than they do about the causes of global warming.
   e. Many people believe the benefits of energy outweigh the costs.
1. Justify: …………………………………………………………………………………….
   ……………………………………………………………………………………………..
4. Do you agree with the author's idea? Justify your answer.
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ………………………………………………………………………………………

Read the passage below; then answer the questions that follow.

Near the outskirts of the Andes Mountains, there lies an elevated plateau called the Nazca *pampa* (1). At first glance, this stony desert appears featureless except for few breaks here and there in the surface (2). But viewed from the air, this barren expanse of land reveals an extraordinary display of designs in the earth created by ancient peoples (3). Flying is an important means of travel throughout much of the Andes, which is the world's longest mountain chain (4). Looking down from above, one can see geometric spirals, zigzags, and colossal triangles and rectangles, all executed with exceptional precision (5). Nearby, gigantic, well-proportioned outlines of animals and plants can also be seen (6).

Who were the ancient artists who created these enormous sketches, and for what purpose?..
There have been countless theories about the origins of the Nazca drawings, some of them quite outrageous, such as the suggestion that the Nazcans drew these designs to make landing strips for extraterrestrial visitors. To date, however, no one knows for sure whether these ancient drawings were meant to be astronomical calendar, a ritual highway to sacred sites, or a landing site for UFOs or whether they were created for some other mysterious purpose.

1. *What is the passage about?*
   …………………………………………………………………………………………

2. *Which sentence, if inserted into the blank line in the second paragraph, would be the **most** consistent with the writer's purpose and intended audience?*
   a. That's one really interesting sort of question.
   b. I don't have a clue myself.
   c. Lots of different people have asked that question over the years.
   d. The answer remains a mystery.
   e. You were doubtless wondering the same thing.

3. *Which sentence is **least** relevant to the main idea of the first paragraph?*
   a. Sentence 2
   b. Sentence 3
   c. Sentence 4
   d. Sentence 5
   e. Sentence 6

4. *Between the first and second paragraphs of the passage , the writer's approach shifts from:*
   a. demonstration to analysis
   b. description to inquiry
   c. exploration to explanation.
   d. cause to effect.
   e. narration to persuasion.

5. *Which of the following best summarizes the main points of the passage?*

a. When seen from the air, the seemingly barren Nazca *pampa* reveals a striking array of precisely executed designs, the purpose of which is still a subject of speculation.

b. Although nobody knows for certain why the ancient Nazcans created the geometrical designs found in their homeland, some people believe they were intended to attract UFOs.

c. Until airplane travel became common in the Andes, nobody was aware of the extraordinary designs created by the ancient Nazcans.

d. The strange designs found on the otherwise featureless surface of the Nazca *pampas* indicate that popular interest in the existence of extraterrestrial forms of life dates back to ancient times.

e. Nestled in the Andes Mountains, the Nazca *pampa* is a desert plateau whose irregular rock formations have been extensively studied by anthropologists.

- Justify your choice:

………………………………………………………………………………………………

………………………………………………………………………………………

When you finish the test try to answer the following questions:

- How many times have you read the passages?

………………………………………………………………………………………

- Are the passages difficult to read?

………………………………………………………………………………………

- Are the authors' ideas clear?

………………………………………………………………………………………

- Are the questions easy or difficult to answer?

………………………………………………………………………………………

- Which questions are found difficult and which ones are found easy? (mention the number of the question only).

Difficult	Easy

- Why do you think these questions are difficult?

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………

Appendix (D)

Worksheet 01: Planning Strategies/Previewing

1. *Setting reading goals and objectives*
2. *Previewing a document*

Reading goals: …………………………………………………………………………

Reading objectives:

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

Previewing a document:

Use the questions and/or instructions in the left column to guide your pre-reading. Record your responses in the right column.

Previewing the doc	Responses
What is the title of the document? Who is the author? What is the source? Is it relevant to your research?	
Describe any visuals in the section you have selected to read.	
Provide some comments about the document (e.g., length, number of paragraphs or pages, layout, visuals, etc.).	

Predicting the main idea	
Read the title of the text and make predictions about the main idea. What will this text be about?	
Now, read the first and last paragraphs. What do we know about the text that we didn't know before?	

Appendix (E)

Worksheet 02: 30-second Expert

To complete this activity, take a few minutes to fill in the left column, "what do I know about this topic?" once you have written all that you know about the topic, follow the steps below.

Step 1: Stand and find a partner. Stay standing.

Step 2: One person shares his or her thoughts while the other listens. You have 30 seconds to share. Begin by saying, "I am an expert on this topic because I know …"

Step 3: The listener will summarize what she or he has heard. Begin your summary with "According to" (insert name) and summarize what you heard. After your summary, ask, "Did I get that right?"

Step 4: Reverse roles. Speaker becomes listener and listener now speaks.

Step 5: Be sure to thank your partner when you finish.

Step 6: Record any new knowledge in the right column.

Topic:………………………………………………………………………………………
…….

Partner's name:……………………………………………………………………………….

What do I know about this topic?	What new knowledge or understanding have I gained from listening to my partner?

Appendix (F)

Worksheet 03: Vocabulary Awareness Chart

3. Scan the title, subtitles, captions, reading aids, and first and last paragraphs. Identify ten words that seem important (for instance words that are important to the topic, content vocabulary, or key concepts). Once you have identified these words, write them in the "Word" column. Use a dictionary to look up the words you have never met before.

Word	Definition in your own words
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

4. Select 5 words and use them in meaningful sentences

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

« Promoting Critical Reading Strategies among Algerian ESP Students: a Case Study»

Abstract:

Recent changes have affected every human enterprise including higher education institutions. Considering the ESP field, a paradigm shift from traditional to a more critical pedagogy was inevitable Relevant to this, an urge is felt to argue for the significance of promoting critical reading strategies among Algerian ESP students, particularly at the National Higher School for Hydraulics (ENSH). For doing so, a mixed methods experimental research design has been adopted. The focus is principally made on explicitly instructing engineering students in critical reading strategies. Results revealed that explicitly instructing ESP students into critical reading strategies has promoted their critical reading strategies awareness and enhances their critical reading abilities. Yet, in the light of these findings, some recommendations are put forward to ameliorate the Algerian ESP enterprise.

Key words: critical reading; critical reading strategies; ESP; explicit instruction.

« Développement des stratégies de lecture critique chez les étudiants algériens en ESP : un cas d'étude »

Résumé:

Dans le domaine de l'ESP, le passage d'une pédagogie traditionnelle à une pédagogie plus critique était inévitable. Dans ce contexte, il s'agit d'insister sur l'importance de la promotion des stratégies de lecture critique auprès des étudiants algériens en ESP, notamment à l'École nationale supérieure d'hydraulique (ENSH). Pour ce faire, un modèle de recherche expérimental à méthodes mixtes a été adopté. L'accent est principalement mis sur l'enseignement explicite aux élèves ingénieurs des stratégies de lecture critique. Les résultats ont confirmé l'enseignement explicite des stratégies de lecture critique aux étudiants ESP a favorisé leur prise de conscience des stratégies de lecture critique et amélioré leurs capacités de lecture critique ; En même temps, cela a augmenté leur motivation envers la langue anglaise ainsi que leur capacité de lecture, ce qui les aide à surmonter leurs difficultés à lire des documents spécialisés en anglais. Cependant, à la lumière de ces résultats, certaines recommandations sont proposées pour améliorer l'entreprise algérienne de l'ESP.

Mots clés: lecture critique ; stratégies de lecture critique ; ESP ; enseignement explicite

"تنمية استراتيجيات القراءة الناقدة لدى طلاب اللغة الانجليزية المتخصصة:دراسة حالة "

الملخص:

لقد كان للتغيرات الراهنة الأثر الكبير على كل المؤسسات البشرية بما في ذلك مؤسسات التعليم العالي.فيما يخص مجال دراسة اللغة الانجليزية كلغة تخصص، كان لابد من حدوث نقلة نوعية في النموذج من أصول التدريس التقليدية إلى أصول تدريس أكثر نقدية.. بناءا على هذا، أصبح هناك حاجة ملحة للنظر في أهمية تنمية استراتيجيات القراءة الناقدة لدى طلاب اللغة الانجليزية المتخصصة الجزائريين، خاصة بالمدرسة الوطنية العليا للري. لأجل تحقيق ذلك تم اعتماد تصميم بحث تجريبي مختلط، حيث انصب التركيز بشكل أساسي على التدريس المباشر لاستراتيجيات القراءة الناقدة لطلاب هندسة الري. في هذا السياق أكدت نتائج الدراسة على ان تدريس استراتيجيات القراءة الناقدة لطلاب الانجليزية المتخصصة بطريقة مباشرة مكنهم من زيادة وعيهم بهذه الاستراتيجيات و تطوير قدراتهم الخاصة بالقراءة الناقدة. على ضوء هذه النتائج تم اقتراح بعض التوصيات منظومة اللغة الانجليزية كلغة تخصص في الجزائر و كذا القائمين عليها من أجل تحسين أدائها.

كلمات مفتاحية: القراءة الناقدة، استراتيجيات القراءة الناقدة، الانجليزية كلغة تخصص، التدريس المباشر.