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THE EFFECT OF THE DEEP-END METHODOLOGY IN TEACHING ENGLISH FOR SPECIFIC PURPOSES ON DEVELOPING LEARNERS' VOCABULARY

A Case Study of First Year Master Students in the Department of Biology at Abd Elhafid Boussouf University Centre of Mila

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Dedication

I dedicate this work to:

the soul of my beloved grandmother **Fatima** who had always been a source of love, care and prayers. May Allah bless her

my cherished parents, mother-in law and father-in law without whom this work wouldn't see the light; thank you for being always on my back

my husband **Ghonime** for his unconditioned support and encouragement

my kid **Ishak** for his inspiration

my sisters, brothers and brothers-in-law for their constant assistance

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Abstract

Language for Specific Purposes (LSP) serves to bridge the existing gap between the requirements of future professions and what learners actually encounter in language classrooms. Due to the globalisation and the tremendous increase of international communication in various fields, the demand for English for Specific Purposes (ESP) is expanding in Algeria. Despite this need, ESP instruction is still limited to traditional methodologies, like the genre-based approach. Believing in the essential role adequate methodologies can play in promoting an ESP course, the focus of the current study is to shed light on an innovative methodology, termed the 'deep-end'. This research investigates the impact of using this methodology on the most important language aspect which is vocabulary. Thus, it is hypothesised that in case the deep-end methodology is implemented in English for Specific Purposes' instruction, learners will enhance their vocabulary stock and improve their vocabulary learning strategies. To this end, an experimental research has been conducted involving a sample of 30 students divided into two groups from the department of Biology, Faculty of Science and Technology at Boussouf University centre of Mila, Algeria. To examine the treatment effectiveness, a pre-test and post-test were administered to both groups (experimental and control). Based on the statistical findings using the t-test, the experimental group outcomes in the post-test were remarkably better than those of their counterparts in the control group. Data obtained indicate that an ESP course which integrates the deep-end methodology assists the learners to develop their vocabulary. In light of these results, the deep-end methodology is recommended in ESP courses in Algerian universities.

List of Abbreviations and Acronyms

AWL: Academic Word List

BBC: British Broadcasting Company

CALL: Computer Assisted Language Learning

CAPT: Computer-Assisted Pronunciation Training

CMC: Computer Mediated Communication

EAP: English for Academic Purposes

EBE: English for Business and Economics

EFL: English as a Foreign Language

EGAP: English for General Academic Purposes

EGP: English for General Purposes

ELP: English for Legal Purposes

ELT: English Language Teaching

EMFE: English for Management, Finance and Economics

EMP: English for Medical Purposes

EOP: English for Occupational Purposes

EPP: English for Professional Purposes

ESAP: English for Specific Academic Purposes

ESL: English as a Second Language

ESP: English for Specific Purposes

ESS: English for Social Studies

EST: English for Science and Technology

EVP: English for Vocational Purposes

GE: General English

GMF: Genetically Modified Food

GSL: General Service List

ICT: Information and Communication Technologies

ITS: Intelligent Tutoring System

L2: Second Language

LSP: Language for Specific Purposes

MCQ: Multiple Choice Questions

PPP: Presentation – Practice – Production

TOEFL: Test of English as a Foreign Language

VoIP: Voice-over Internet Protocol

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GENERAL INTRODUCTION

Since the early 1960s, English for Specific Purposes (ESP) has become one of the most influential areas in English as a Foreign/Second Language (EFL/ESL). This increased interest can be noticeably reflected in the concern of teachers, researchers and program designers in developing courses which are aimed at academic and professional goals. These courses are designed to address ESP learners' goals in fields such as business, engineering, medicine, law, accounting, etc. especially with the globalisation in trade, economy, science and technology in addition to the urge in international communication in different fields.

ESP researchers have proposed two frameworks for teaching ESP: the 'genre-based' and the 'deep-end' methodologies. The former is centred to the use of appropriate language in terms of register, discourse, and genre whereas the latter focuses on ESP learners and the skills which are required to communicate in various specialised situations. It is maintained that what characterises the deep-end methodology is that learners are pushed to practice their communicative skills to the maximum with minimal preparation. It also stresses the aspect of learners' centeredness as it enables them to reflect upon their strengths and weaknesses by themselves. Thus, learners are supposed to improve their risk-taking skills and promote communicative and intercultural competences by developing their intercultural awareness.

Similarly, vocabulary acquisition has always been the core of foreign language learning whether for general or specific purposes; very simply because words are necessary for communication to take place. Consequently, in order to help ESP learners meet their own goals in communicating fluently in profession-related real life situations, specialised vocabulary should be considered in relation to their motivation, desires, and needs. This also implies the role of teachers to facilitate the learning of ESP vocabulary in real life tasks rather than separately to practice and consolidate meaning and ensure purposeful learning.

Insights from this research evidence have deepened our understanding about the appropriate pedagogies which lead to meaningful ESP vocabulary learning. It, therefore, serves to keep instruction attached to learners' environment and real life experiences in workplace which are said to be linked to their needs and interests. This actually entails the use of the deep-end methodology. Subsequently, the learning of words is supported in real world communicative situations while being exposed to authentic contexts related to particular disciplines or occupations. This study sheds light on the place of vocabulary in professional environment. So, the current research project aims at investigating the effect of using the innovative deep-end course design on ESP learners' scientific vocabulary. It also attempts to determine to what extent this methodology fosters vocabulary learning strategies.

1. Statement of the Problem

Considerable research in EFL asserts that learners do not share the same reasons and needs to language learning. The language teaching, thereby, must be carefully geared up to fit these needs and purposes. As a result, the interest in the field of ESP has grown very quickly. Since words seem to be the major channel through which learners can communicate either for academic or for professional purposes, increasing vocabulary is of utmost importance. Nevertheless, research on vocabulary acquisition mechanisms and teaching strategies, in relation to ESP pedagogies, have received little attention. This specific problem is to be examined in this dissertation. There is a need then for better understanding on the relationship between vocabulary acquisition and revolutionary methodologies to ESP teaching such as the 'deep-end'.

2. Research Questions

The following research questions are addressed in this study:

- What are the alternatives in ESP instruction and what ideas about vocabulary acquisition are they based on?
- How can the “deep-end” methodology be used in an ESP course and to what extent does it promote ESP learners’ scientific vocabulary?

3. Hypotheses

- If the “deep-end” methodology is implemented in ESP courses, instruction is likely to be more efficient.
- Providing that the “deep-end” teaching model is used in an ESP instruction, learners’ vocabulary will be enhanced.

4. Research Methodology

4.1. Sampling

Participants enrolled in this research are First-Year Master students in the Department of Biology, Faculty of Sciences at Boussouf University Centre of Mila. They are specialised in a specific field of study, which is ‘Vegetal Biotechnology’. The sample consists of 30 students among a population of 59 students. They are reasonably supposed to have homogeneous background knowledge as well as level of proficiency. This is because they are all Algerian students of the same grade who are exposed to the English language only through formal education for at least six years of English for General Purposes (EGP) and three years of ESP.

4.2. Data Collection

In order to investigate the problem at hand, we opt for an experimental methodology through three stages: a pre-test, a treatment, and a post-test. To diagnose their vocabulary

level, a randomly chosen sample of students from the department of Biology (n=30) is to sit for a pre-test. They will be separated into two groups. The methodology used with the control group (n=15) would be the traditional “genre-based” approach. As for the experimental group (n=15), they would receive four assignments following the “deep-end” methodology for one month. After that, a post-test is to be conducted and the results of both groups are compared to check the effectiveness of instruction.

5. Structure of Dissertation

This dissertation is inspired by the belief that the “deep-end” methodology has the potential to enhance ESP learners’ vocabulary. To find out the interrelation existing between ESP teaching pedagogies and vocabulary acquisition, the current work is structured into two chapters.

The first chapter, which will be devoted to explore the relevant literature, is divided into three sections. In section one, key assumptions about ESP are introduced to identify the steps of course design and discuss its various instruction methodologies. The second section clarifies the notion of ‘deep-end’ methodology and its characteristics and shows how it is implemented in ESP classroom using new technologies. As for the last one, it deals with the topic of vocabulary stating its definitions and types and highlights its teaching, learning, and assessment strategies taking into account its role and the way it is taught in ESP. Concerning the second chapter, it will investigate the impact of using the “deep-end” methodology in ESP classrooms on the acquisition of vocabulary by analyzing the results obtained from the pre-test and post-test.

CHAPTER ONE

REVIEW OF LITERATURE

Introduction

With the increasing urge to cater for the demands of the labour market and the need for highly skilled professionals as new trend in ELT, ESP has constantly been growing. In essence, researchers in the field attempt to put the learner's needs and aims in the forefront of the instruction and to give more attention to learner-centeredness. It attempts to focus on communicative competences as well, since they are essential elements in ESP courses besides discourse analysis, register and genre.

It is most known that vocabulary is fundamental to second/foreign language teaching and particularly to the sphere of Language for Specific Purposes (LSP). For learners to develop their lexicon, teachers should encourage them to learn words involving technical English, scientific English, and English for tourism, business, etc. to enable them to communicate effectively in a wide variety of specialised contexts. In a sense then, language is not only used to have some wide range of academic achievement, but it is also important for communication in professional contexts. To this end, ESP learners should become aware of the importance of language learning strategies and get trained to use them appropriately. This communicative movement entails the use of the 'deep-end' methodology in which learners are pushed in at the deep-end by practicing language input embedded within a context with a minimum of preparation.

This chapter, hereby, will state various definitions and assumptions of ESP and its branches. In addition, some theoretical issues about ESP course design and instruction are introduced to trace back the development of the deep-end methodology and explain how it is

implemented in ESP classroom using new technologies. We shall also tackle the topic of vocabulary and identify its different types. Finally, this chapter considers the different strategies of teaching, learning and testing vocabulary, discusses its role and integration in an ESP course and finally draws conclusions about using the deep-end methodology to promote ESP learners' overall vocabulary.

Section One

Key Notions about English for Secific Purposes

1.1. General Overview of ESP

The teaching of ESP has generally been considered as a separate area within ELT. According to Hutchinson & Waters (1987: 6), the importance of ESP as a multi-disciplinary trend has emerged due to three main reasons. First, the demand of a "Brave New World" led to its rise especially after the end of World War II, the subsequent prosperity in various fields, the oil Crisis of the early 1970's and the flow of money embedding English as the language of the knowledge into countries that are rich of oil. An other reason is the "revolution in linguistics" because attention shifted from defining formal language features to discovering the ways in which language is used in real communication. The last one includes the "focus on the learner" , which was influenced by educational psychology. It is believed that the key distinguishing characteristic of ESP is that it has developed its own methodology and its research is drawn from various disciplines in addition to applied linguistics. Its main concern has always been connected to needs analysis and preparing learners to communicate effectively in their specialised field of study or work (Orr, 2010). In a sense, it is a significant trend to ELT as it could bridge the gap between course design and learner's specific needs rather than focusing on theoretical matters. That is to say, the emphasis of ELT has always been on concrete outcomes whereas the theory behind ESP is based on specific learners' needs.

1.2. Definition of ESP

As a matter of fact, there is no one agreed-on definition of ESP. Attempting to give a well grounded one, it is necessary to trace back its definitions along literature.

For example, Basturkmen (2003) in addition to Hayati (2008) and Strevens (1988) define ESP in terms of two distinct characteristics. Gatehouse (2001: 1-2) states that the absolute characteristics entail the teaching of English, which is "in contrast with GE", meets "specified needs of the learner" in a way that it is directed to "particular disciplines, occupations and activities" along with both, the language related to these activities in terms of "syntax, text, discourse, semantics, etc., and analysis of the discourse". By variable characteristics, he means those features of ESP that may be found in ELT "but not necessarily" as they can be limited to the target skill or not based on "any pre-ordained methodology".

Moreover, Dudley-Evans & St John (1998: 4-5) suggest a modified conception of that presented by Strevens'. They drop the notion of the distinction between ESP and General English (GE) and insert more characteristics, as well. They argue that ESP may be used to teach English to all types of learners with a preliminary knowledge or beginners "either at a tertiary level institution or in a professional work situation" or even "at secondary school level".

The most well-known definition to ESP, is that of Hutchinson & Walters (1987: 19) who suggest that it is an "approach" to language teaching which puts learners' goals at the first place. Accordingly, the content and methodology of the ESP course must take into consideration the "learners' reasons for learning". Other scholars as Basturkmen (2006), Johns & Price-Machado (as cited in Hayati, 2008) and Robinson (1991) further agree with this outline and state that ESP denotes teaching English with the aim of enabling learners to communicate effectively in various specialised areas of study or profession.

As far as the above definitions are concerned, it is clear that ESP is no more regarded as a separate area from EFL. Instead, it is viewed as a framework to teaching languages which

focuses on learners' communicative needs in real life contexts embedded in academic or non-academic situations.

1.3. Branches of ESP

Carter (as cited in Gatehouse 2001) distinguishes between three distinctive areas of ESP: English as a restricted language, English for Academic and Occupational Purposes, and English with specific topics. To him, the former is labelled as such since it is purely limited to specific contexts and cannot be useful in any other situation. To illustrate this, he provides as an example, the language vocabulary items used in the case of air-traffic controllers or waiters. Carter believes that English for Academic Purposes (EAP) and English for Occupational Purposes (EOP) must be identified under the same category. This is because they both share the same ultimate goal, which is having a job in spite of the fact that they are dealt with by different means. By English with Specific Topics,he means the branch which is created by the transmutation of the focus of the ESP course from purpose to topic. This view is shared by Hutchinson & Walters (1987) who emphasise on the relation ESP has with other distinctions in their overall tree of ELT. Yet, they recognise three other branches: English for Science and Technology (EST), English for Business and Economics (EBE) and English for Social Studies (ESS), which are further classified into EAP and EOP.

However, two major divisions of ESP are identified by Robinson (1991): EOP and EAP. She claims that EST cuts across both of these categories whereas Kennedy & Bolitho (1984) consider it as an other major division for its contribution in the development of ESP. Furthermore, Basturkmen (2010) differentiates between English for General Academic Purposes (EGAP) (e.g. English for academic reading) and English for Specific Academic Purposes (ESAP) (e.g. English for medical studies).

This debate is resolved by Dudley-Evans & St John (1998). In their model of ESP family tree, they try to classify branches into disciplines or occupations: EAP and EOP. The figure 1.1 comprehensively illustrates this division:

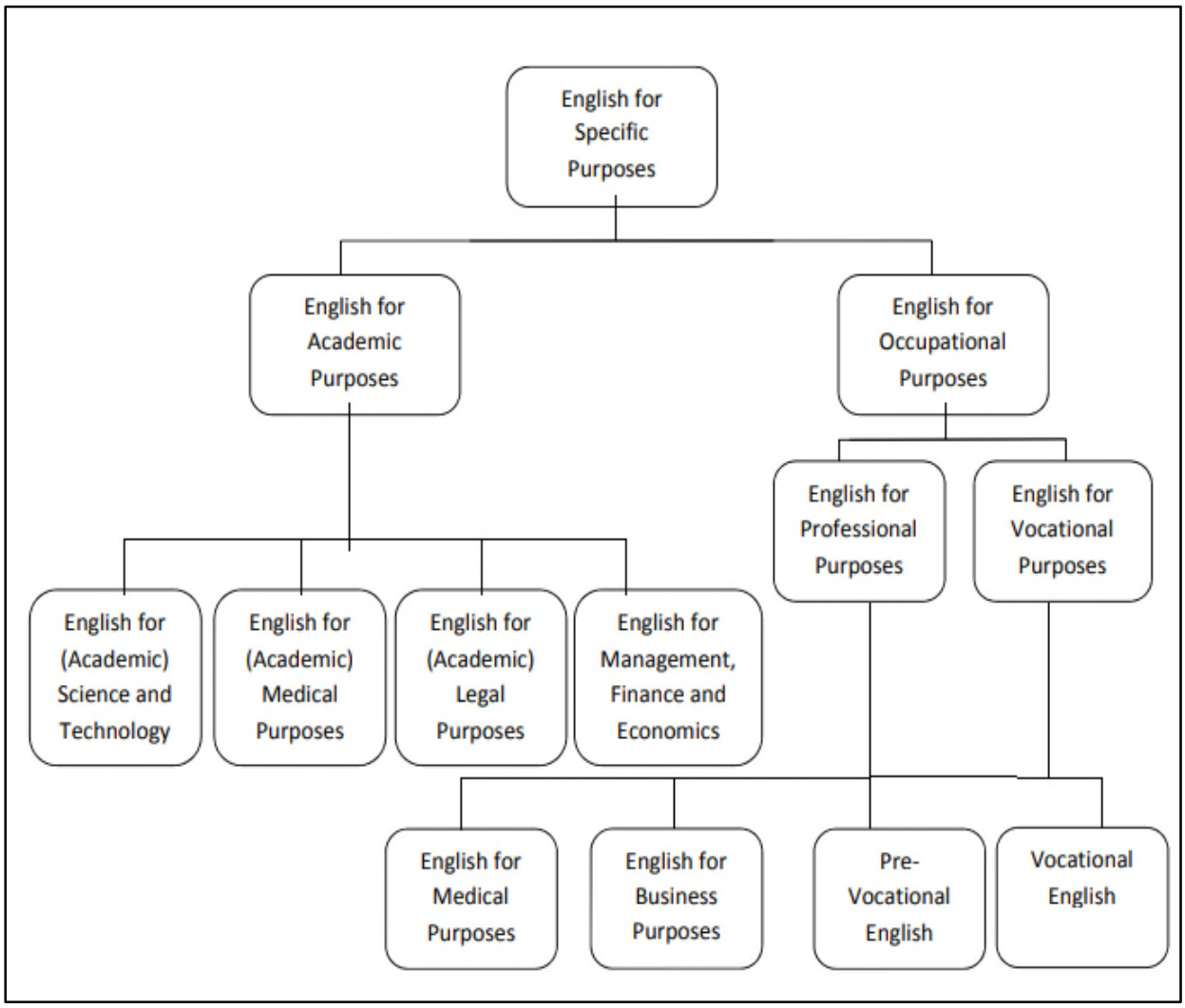

Figure 1.1. **Classification of ESP types (Dudley-Evans & St John, 1998: 6)**

1.3.1. English for Academic Purposes

EAP is concerned with the teaching of particular communicative skills which are epmarted to learners to assisst them in formal educational contexts (Flowerdew & Peacock as cited in Dashtestani & Stojković, 2015; Jordan, 1997; Hyland, 2002c). It is believed to be an ambrella for numerous sub-areas including: EST, English for Medical Purposes (EMP),

English for Legal Purposes (ELP) and English for Management, Finance and Economics (EMFE).

1.3.2. English for Occupational Purposes

EOP, however, is defined as “English for professional purposes in administration, medicine, law and business, and vocational purposes for nonprofessionals in work or pre-work situations”. Further Sub-categories of EOP involve both English for Professional Purposes (EPP) and English for Vocational Purposes (EVP) (Dudley-Evans & St John,1998: 7). That is to say, as opposed to EAP, which is essentially required for study, EOP is related to the teaching of English needed in workplace.

1.4. ESP Instruction

Since the discipline-based content is fundamental to ESP, Dudley-Evans & St John (1998: 14) assert that teachers must have a reasonable mastery of the specific discipline and the “professional activities the students are involved in”. In addition to Swales (1985), they consider that the term “practitioners” is used instead of “teachers” for their work is not exclusive to teaching as usually expected but rather extended to other roles as course designers and material providers, researchers, collaborators and evaluators. In fact, the role of materials provider and developer is precisely endowed to ESP teachers more often than EFL teachers (Robinson, 1991). This is justified by the fact that materials are particularly useful in ESP for they are the source of the specialised language learners must be exposed to.

1.4.1. ESP Course Design

ESP methodology has been widely influenced by ELT research as teachers have at their disposal a variety of options in designing and implementing ESP courses. Empirical

studies provide considerable amount of techniques and strategies to ensure successful course design and effective learning and teaching. To this end, Nation & Macalister (2010) synthesise a well-refined sketch to describe the interrelated factors affecting the process of ESP course design. In the following figure, the outer circles represent the theoritical background and practical considerations behind the ESP course design; namely principles, environment and needs. The 'goal' as the core of the inner circle stresses the importance of setting clearly defined goals at the very beginning of the course to highlight the processes of 'content and sequencing', 'format and presentation', in addition to 'monitoring and assessment'. All these activities are guided by an ongoing process of 'evaluation'.

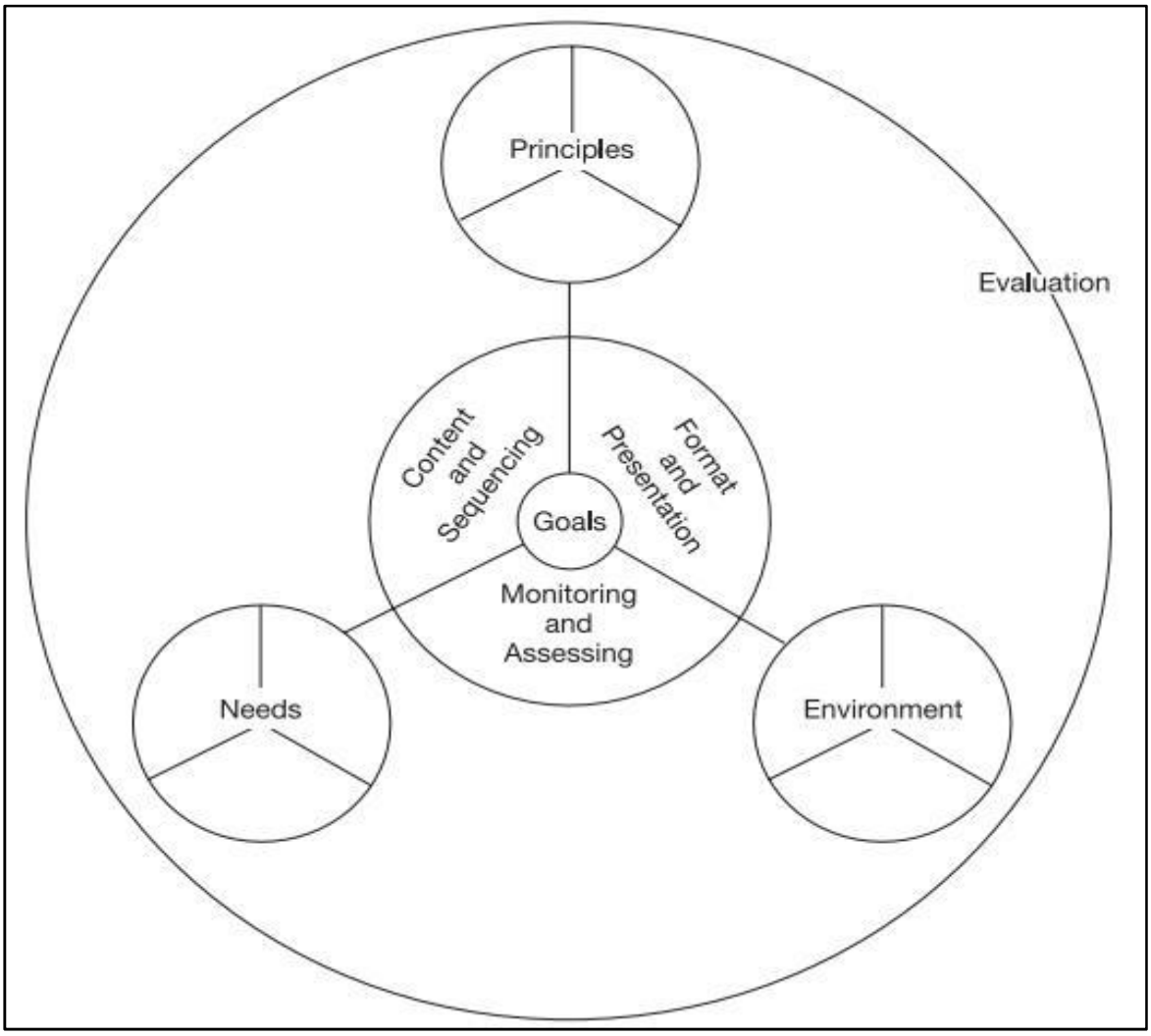

Figure 1.2. **The Constituents of ESP Course Design (Nation & Macalister, 2010:3)**

Grave (as cited in Nation & Macalister, 2010) provides a systematic outline of an ESP course following a number of steps: carrying needs assessment along with needs analysis followed by setting goals and objectives; designing, selecting and organising content materials, activities and techniques; and finally evaluating the efficiency of the course. The figure 1.3 clearly demonstrates how these steps are conducted to bring about an effective ESP course.

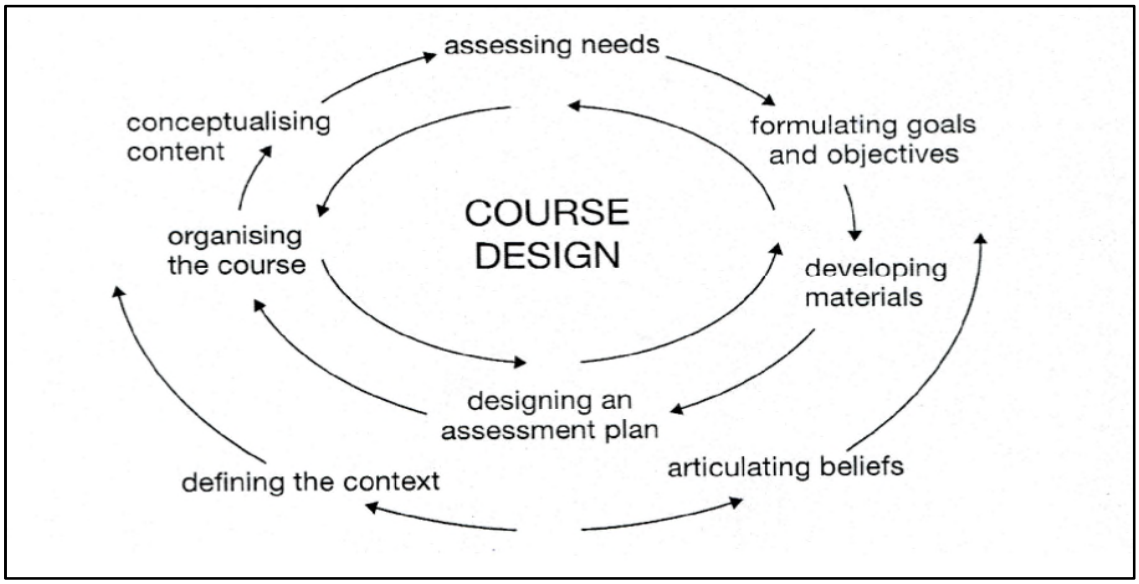

Figure 1.3. **The Sketch of Syllabus Design suggested by Grave (as cited in Nation & Macalister, 2010: 136)**

In short, before instruction actually takes place in an ESP classroom, course designers and teachers need to take on various procedures starting from needs assessment to content conceptualisation taking into account the learners' principles, goals, needs and environments.

1.4.2. ESP Teaching and Learning

After clarifying the process of designing an ESP course, it is worth mentioning the way teachers and learners implement this guideline into real classroom contexts. Recently, there has actually been a shift from prevailing approaches to ESP course design, which

emphasise on the specialised grammar and lexis to the revolutionary Communicative Approach. Hence, Basturkmen (2006: 03) proposes two frameworks of teaching ESP: “genre based approaches” and “deep-end classroom methodology”.

Originally, the term ‘genre’ means ‘kind’ in Latin. It is used to refer to different types of texts corresponding to distinctive recurring situations (Hyland, 2002b; Hyland, 2006). Therefore, Bazerman (1997: 19) considers that “genres” serve as “frames for social action”. Nesi and Gardner (2012: 36) identify various genres such as “case study, critique, design specification, empathy writing, essay, exercise explanation, literature survey, methodology recount, narrative recount, problem question, proposal, and research report”. These genres could be grouped “along five dimensions which suggest how informational, narrative, situation-dependent, persuasive and impersonal the writing is” (Nesi and Gardner, 2012: 43). Many scholars in the field of Applied Conversation Analyis are trying to adapt insights from research on the analysis of conversation and genre to ESP teaching padagogies (Bowles, 2012). As a matter of fact, the genre-based approch was issued as a reaction to the process approaches since they do not deal with the need to identify the specificity in writing situations and neglect the requirements of particular writing tasks. Instead, it provides the learners with “explicit and systematic explanation of the ways language functions in social contexts” (Hyland, 2002a: 18).

It is argued that the ‘genre based approaches’ emphasise on the variations in types of texts in relation to “target discourse communities” that L2 learners would possibly encounter thanks to ESP instruction. In non-professional contexts, learners tend to deal with genres such as “term papers, small scale research projects, seminars, and research reports” (Basturkmen 2006: 03). In favour of this methodology, Hirvela (2013: 80) contends, “with the use of genre analysis techniques, ESP learners can be taught how to recognise (as readers) and

mimic (as writers) the schematic structure of texts in their chosen discourse communities". Learners are supposed to recognise these 'frames' or properties of various genres which enable them to analyse texts according to the shemata they built. Parkinson *et al.* (as cited in Hirvela, 2013) provide a systematic procedure of the genre based pedagogy in ESP contexts involving pre-reading activities, discussion, and tasks about vocabulary and comprehension of science coursebooks or journal articles. "Genre approaches in ESP thus attempt to explicate the lexico-grammatical and discursive patterns of particular genres to identify their recognisable structural identity" (Hyland, 2013: 98). Thus, genres are not regarded only as "texts to be analyzed for their grammatical and discoursal features". They rather "go beyond text to take social purposes into account, including ways members of discourse communities are guided by shared rhetorical purposes when they speak and write" (Benesch, 2001: 17). In other words, learners are supposed to stimulate different forms of communication used in target specialised contexts by analyzing text types since language is perceived to be embedded in social realities. That is to say, the underlying methodologies are centred to the use of appropriate language in terms of register, discourse, and genre.

Freedman (1999) criticises this approach for the intentional premeditating of the genres and despatching them from their natural complex socio-cultural contexts that embody them into classroom situations. Indeed, this limits the extent to which learners understand the genres to their excursive features since they are dislocated from their real life situations.

The deep-end methodology, however, puts the learners into communicative situations and provides instruction related to problematic points they encountered during the simulation task they performed (Dudley- Evans & St John, 1998). This methodology is to be well explained in the next section together with its characteristics and its relation with modern technologies.

Section Two

The Deep-End Teaching Methodology

2.1. Definition of the Deep-end Methodology

Traditionally, the teaching/learning process is commonly divided into three stages; the ‘presentation’ whereby materials are delivered to learners, the ‘practice’ in which learners get engaged into drilling activities, and the ‘production’ which involves utilising the language points acquired creatively in natural interaction (Johnson, 1979). With the emergence of the communicative trend, however, learners’ errors are no longer regarded as a deficiency. Learners, hence, are encouraged to develop risk-taking skills by being engaged into free-practice tasks of points they have not fully mastered. Consequently, many alternatives for the 'presentation/ practice/ production' sequence (PPP) are proposed; the most influential of which is what is denoted by Brumfit (1978) as the ‘deep- end’ strategy. Johnson (1979) refers to communicative tasks as “the deep-end strategy” and assumes that it differs than the traditional procedure in many ways. The following figure summarises the instruction stages of the communicative deep-end strategy as compared to the traditional model:

Traditional procedure	Stage 1 Present Stage 2 Drill Stage 3 Practice in context
Communicative procedure	Stage 1 Students communicate with available resources Stage 2 Teacher presents items shown to be necessary Stage 3 Drill if necessary

***Figure 1.4*. The Change in Traditional Classroom Procedure (Brumfit as cited in Johnson, 1979: 34)**

The modern preoccupation with ESP instruction has led to a wide range of studies, which are revealed in a number of approaches. Accordingly, the deep-end methodology is adopted to allow for extensive use of real life simulations in ESP classroom. Proponents of this approach, thereby, call for a message-focus and a shift from classroom to 'real world'. Dudley-Evans & St John (1998) contend that what differentiates this methodology than others lies basically in the implementation of various tasks that focus on specialised areas of interest. They maintain that it can be adopted to teach learners with higher levels in English; i.e., learners with a good vocabulary stock in different fields and disciplines. This is actually due to the fact that ESP learners are supposed to perform a communicative task at the very beginning of the instruction.

In short then, the benefit of the underlying methodology is that it reflects the learners' target world contexts: academic or professional allowing them to be faced with communicative situations such as case study activities, projects, presentations, role-plays, and simulations.

2.2. Implementation of the Deep-End Methodology in ESP Instruction

Field studies highlight the integration of 'task-based' methodology along with 'deep-end methodology' into the ESP course. In practical terms, researchers (Basturkmen, 2006; Dudley-Evans & St John, 1998; Johnson, 1982; Johnson, 1999) estimate that in the 'deep-end' model, learners are to be set to perform a communicative task right at the beginning of the lesson without conducting any kind of brainstorming or warm-up. They hypothesise that performance is regarded as the point of departure of the ESP instruction reversing the normal classroom sequence of PPP. "Students are put into a communicative situation (thrown in at the 'deep end') as a prelude to any instruction: all subsequent teaching is based on whether they sink or swim" (Harmer, 1982: 164-165).

Dudley-Evans & St John provide a well-detailed framework explaining the procedures of the deep-end approach in an ESP classroom. They point out:

> *"The main input strategy may come after the performance, based on comments from the teacher and from the learners' peers. As the preparation phase is controlled by the learners, another effective approach is to develop materials that support each learning stage but to supply them on request, as an option"*(Dudley-Evans & St John, 1998: 190).

Most obviously, teachers and learners can determine in what ways the latter's prior knowledge and competences are proved sufficient for the task and in what ways they fail them. Only then, the teacher can provide them with items' drills to focus on the aspects of language that were problematic for the learners in the first stage of performance.

In a way then, the implementation of the deep-end methodology "helps to develop risk-taking skills ... and great confidence" as it enables ESP learners to communicate effectively when faced with such situations in real world (Johnson, 1999: 94). Brumfit (1978) also supports the use of this methodology because the course content is student-determined depending on their performance at the first stage.

In this methodology, Dudley–Evans & St John (1998) further identify two correlated factors: that of the understanding that learning is associated to exploring and the other is attributed to the ability of technology to provide wide applications of this exploration. The main advantage is that learners can have access to the source material in their own time, work through the material at their own pace, and do all this without necessarily having to interact with a teacher.

2.3. Modes of Technology Compatible with the Deep-End Methodology

A milestone in materials design and development is the wide range of materials found in the form of a textbook, a workbook, a cassette, a CD-Rom, a video, a photocopied handout or a newspaper to name few (Tomlinson, 1998: xi). New technologies are also fundamental to language learning, and basically to LSP as they support the use of different forms of language. This role is acknowledged by many researchers as Bloch (2013) who admits that technological growth has been of great help to ESP pedagogies including the deep-end methodology. These technologies can even incorporate varied contexts simultaneously allowing for the integration of communication skills with the speaking and writing skills (Chapelle, 2003). Currently, with the development of interactive multimedia, internet, Information and Communication Technologies (ICT), Computer-Assisted Language Learning (CALL) and Computer Mediated Communication (CMC), the implementation of various modes of technology as a tool to supplement deep-end methodology is inevitable in ESP instruction.

2.3.1. Video Discs and CD-ROMs

Dudley–Evans & St John (1998) indicate that this storing and transmitting media of information can be used as a valuable source of materials for ESP pedagogy. They state that video discs and CD-ROMS tend to support the learning of language skills, vary topics and provide materials along with data for the course and create authenticity in the classroom. This means that the technology of CD-ROMs can be incorporated into the design and delivery of ESP course as they offer more interactive activities than paper-based materials do.

2.3.2. The Internet

Nesi (as cited in Dudley–Evans & St John, 1998) argues that online courses can be used with individual learners, whole groups, with or without a tutor, and for pair group or whole class work. The Internet is also valuable in ESP courses in that it gives teachers and learners access to a wide range of oral and written texts including newspapers, magazines, scientific journals, news broadcasts, and lectures. Bloch (2013) and Lesiak-Bielawska (2015) suggest that the open-access university courses like MIT's Open Course-ware (http://ocw.mit.edu/courses/electrical-engineering-and-computer-science), Carnegie Mellon's Open Learning Initiative site (http://oli.web.cmu.edu/openlearning/index.php) in addition to available audio and visual lectures available at the University of Yale (http://oyc.yale.edu) and The University of California, Berkley (http://webcast.berkley.edu) often support these materials. One of the related EAP courses is "Purdue University" on-line writing lab available on (http://ow.trc.purdue.edu). It mainly provides handouts on writing skills and enables Purdue students to arrange face-to face tutorial and discuss their works.

Another approach to using the internet in ESP instruction is the tool of online dictionaries that are devoted for particular disciplines such as (InvestorWords.com) which offers definitions of technical terms associated with the area of business or Science Dictionary (www.sciencedictionary.org) for scientific items (Bloch, 2013).

As pointed out by Lesiak-Bielawska (2015), the open access audio materials are available on websites of news organizations such as BBC (www.bbc.co.uk) or National Public Radio (www.npr.org). Videos available on "video-hosting" sites as YouTube, Hulu (www.hulu.com), and podcasts of past shows of radio stations are a vital source for ESP teachers. Additionally, learners' recorded podcasts and videos stored online for free in programs as "Audacity" and sites as YouTube and Vimeo (www.vimeo.com) are said to be

useful in sharing and varying the audiences for ESP learners' works (Bloch, 2013; Kern, 2013).

Owing to the wide range of Internet materials, ESP learners are allowed to interact with target language communities through blogs (Lesiak-Bielawska, 2015). Bloch (2013: 390-391) adds that they offer numerous options for ESP learners since they "can be contextualised into specific contexts for different kinds of audiences, as businesses do as part of marketing campaigns. They can be integrated with other forms of discourse to create new forms of multimodal texts". ESP instruction, in addition, incorporates Wikis as Wikipedia (www.wikipedia.com)

As a conclusion, "online environments provide digital literacy outputs ... tools for analysis of academic discourse; and a medium for both sheltered and authentic practice of online interaction" (Blaj-Ward, 2014: 75). The internet provides the opportunity for ESP learners to be exposed to various materials. Thus, it has increasingly been the most embraced technological tool used in ESP instruction within the deep-end methodology due to its rich content.

2.3.3. Electronic Mail (e-mail), Chatting and Conferencing

According to Robinson (1991) and Sotillo (2000), applications of communication like email, Skype and video conferencing are almost certainly vital in ESP courses as they reflect real life situations and help learners acquire experiences from and outside classroom. They also enhance ESP learners' motivation since they provide authentic and meaningful tasks which involve simulations of real-life interactions (Grosse and Voght, 1991). Besides, Lesiak-Bielawska (2015) emphasises the idea that ESP learners and teachers had better interact synchronously or asynchronously with each other using chat rooms, social networking via

Facebook and Twitter as well as email. This is for the reason that it allows them to communicate with each other and with other users all over the world in real time. Therefore, they can practice the mechanics of discourse in varied contexts and registers that are compatible with these technologies. Moreover, Bloch (2013) suggests that ESP learners can use these chatting services for instant evaluation of oral presentations by commenting, back-channelling, asking and answering questions, etc.

Mullen, Appel, & Shanklin (2009) advocate the use of different voice-over internet protocol (VoIP) services which allow for telephone/video calls and group conferencing using computers. Skype, for example, is one of these commonly used programs. While online conferencing is conducted among many participants, free video calls are made between only two participants. Skype with its latest version enables screen sharing of documents among the teacher, students and other participants.

2.3.4. CALL Materials

As indicated by Garrett (2009: 719), CALL, which refers to "the full integration of technology into language learning", links pedagogy together with theory and technology. CALL, which took hold in the realm of ELT, has revolutionised the way teachers and learners approach ESP. Integrating the computer technology in language learning contexts is based on multimedia that offers different materials such as text, graphics, sound, animation and video and the Internet which allows for global communication (Warschauer, 1996). Hypermedia enables learners to communicate in specialised contexts using specialised terminology. By using video resources and courseware packages they can maximise exposure to new ideas, cultures and situations. These CALL materials have all the advantages of self-access materials; learners can work on their own and carry out tasks without the teachers' support (Dudley–Evans & St John, 1998).

Dashtestani & Stojković (2015) suggest a number of CALL resources which are at the teachers' disposal including: Intelligent Tutoring System (ITS), grammar checkers, automatic speech recognition, Computer-Assisted Pronunciation Training (CAPT), virtual world/ serious game, Internet forum and discussion/message board. Hence, CALL resources are vital in ESP instruction as they supply learners and teachers with plethora of courses and materials.

2.3.5. Computer Based Corpora

Corpora relevant to EAP and EOP provide extremely useful resources with various registers, forms and situations (Gavioli, 2005). Flowerdew (1998) also supports the use of these corpora in language classroom tasks and suggests that teachers can create their own corpora depending on their learners' needs. Thanks to these resources, there is an opportunity for researchers as well as teachers to look into details at lexical features. One example is to investigate the frequency of lexis in a text or a corpus and using the techniques they developed, they can determinate which lexical terms are technical, semi-technical or general vocabulary items. As far as ESP teaching with the deep-end methodology is concerned, the corpora allow the learners using the word processor to look for words or to check whether they have used the appropriate collocations in their writing easily with programs such as 'Microconcord', 'MICASE' or the 'VIEW' (Variations in English Words and Phrases) in the British National Corpus (BNC) (at http://corpus.byu.edu/bnc/) (Bloch, 2013; Lesiak-Bielawska, 2015). This type of activity has been referred to as Data Driven Learning (Johns as cited in Dudley–Evans & St John, 1998). In short, in spite of being often used to promote writing, corpus introduced in ESP courses is proved to yield learners' knowledge of academic vocabulary knowledge, technical word combinations and collocations.

Douglas (2013: 378), on the other hand, calls for integrating these new technologies for assessment purposes instead of using "paper-based tests". He asserts that learners as well

as teachers can benefit of using “software such as Blackboard or QuestionMark” which provide multiple choice and blank filling activities along with videos and graphics. Due to the ongoing development in the automated scoring, it is widely applicable in tests like TOEFL (Test of English as a Foreign Language) and the Pearson Test of English.

To sum up, the deep-end methodology necessitates the implementation of various modes of technology. This is mainly for its communicative goals to be effectively achieved and evaluated. Actually, the five modes described above have undoubtedly winded choice in ESP teaching. They provide the means whereby learners can do more on their own and can control their own learning. In this respect, they complement and extend the aspect of learner-centeredness which is predominating in ELT and ESP pedagogies.

2.4. Characteristics of ESP Courses under the Deep-end Methodology

2.4.1. The Value of Authenticity

The notion of authenticity has been subject to controversy. For some scholars, it refers to using materials “normally used in the learners’ specialist subject area: written by specialists for specialists” (Jordan, 1997: 113). For others, however, it has to do with appropriateness, interaction, outcomes and efficiency regardless of their origin (Widdowson, 1998). Mishan (2005) airs an inspiring view to create authenticity in ESP classroom suggesting that it is measured according to provenance, purpose and content of the material, the targeted learning activity as well as the learners’ attitudes towards this material and its activity. In line with this, authentic materials seem to link between the classroom and the real world. ESP teachers, thus, are interested in implementing them to assist learners perform communicative tasks entailed within the deep-end instruction, especially with the current advent of the Internet.

2.4.2. Purpose-related Orientation

Purpose-related orientation refers to the simulation of communicative tasks required by the target setting. A good example of this resembles ESP learners modelling a conference and getting engaged in activities involving preparation of papers, reading, note-taking and writing (Carter as cited in Gatehouse, 2001). This focus on the communicative skills as the product of instruction seems to be the main concern of using the deep-end methodology in ESP courses.

2.4.3. Self-direction

In regard to the deep-end methodology, self-direction is a key characteristic in ESP since it considers learners more as ‘users’ rather than students. Carter (as cited in Gatehouse, 2001) argues that for teachers to achieve this option in the ESP course, they must allow for a certain degree of freedom on the part of learners to decide upon when, what and how to study. He also states that there must be a systematic attempt to teach the learners how to learn. Turning attention to the deep-end methodology, it thereby fosters learning strategies.

Having accounted for the ‘deep-end’ methodology and its practical implementation in ESP instruction, it is worth mentioning that this framework provides a wide scope for learners to develop communicative skills so as to encounter various specific academic and occupational situations. To this end, aspects of language and vocabulary in particular must be the focus of this instruction. Hence, the third section is to be devoted to the role of vocabulary in an ESP course and how teachers and learners can approach the deep-end model to promote technical, semi-technical and academic lexical terms.

Section Three

Vocabulary Teaching and Learning

3.1. Definition of Vocabulary

Before preceding research about 'vocabulary', it is necessary to clarify its definition in advance. According to the Longman Dictionary of Contemporary English, it refers to "all the words that someone knows or uses". In the same context, Gu & Johnson (1996), Hatch & Brown (1995), in addition to others, link vocabulary to lists of words. However, vocabulary is more complex than this definition may suggest. In order to answer the question 'what is vocabulary?' in a more detailed and thorough manner avoiding any confusing definitions, every aspect that comes with the term must be explained. Schmitt (2000) denies the widely common sense that narrowly attributes the 'word' to its form as a bearer of its meaning. Instead, he describes it in terms of a set of properties or features. He argues that each word is a combination of its meaning, register, association, collocation, grammatical behaviour, written form (spelling), spoken form (pronunciation), and frequency. Other researchers in the National Reading Panel note that vocabulary comprises the four dimensions of listening, speaking reading and writing (Armbruster, Leher, & Osborn, 2001; Reutzel & Cooter, 2003).

Since vocabulary seems to be a central component in any language course content, it has become one of the basic curricular concerns of foreign language teaching. This is due to the fact that Second Language (L2) learners need it to express meanings of the acquired grammatical forms. The role of vocabulary in language instruction is also acknowledged by Wilkins (1972: 111) who admits, "Without grammar very little can be conveyed; without vocabulary nothing can be conveyed". Lewis (1993), as well, indicates that the language does not include only words and grammar but also a lexical base. Accordingly, for learners to be

able to comprehend and effectively communicate meaningful messages in the target language, they must learn and acquire a considerable stock of words.

3.2. Types of Vocabulary

Differentiating between the types of vocabulary is critical to L2 vocabulary instruction since learners deal with various types differently depending on their aims of learning (Jiangwen & Binbin, 2004). In a way then, it helps teachers make decisions about what and how much particular vocabulary learners must encounter, and how they effectively learn this vocabulary.

3.2.1. Spoken Vocabulary / Written Vocabulary

Jiangwen & Binbin (2004: 61) advocate that vocabulary of the written texts mostly contains “function words, non-lexical, i.e., non-content items, including pronouns, prepositions and conjunctions” that are usually less “vague”, “general” and “frequent”. Vocabulary used in spoken language, by contrast, consists of some lexical words which encompass “repetition” and “lexical negotiation”. They also assume that written texts are richer in vocabulary items than the spoken ones. For this, Schmitt & McCarthy (1997) link the spoken vocabulary with the exposure to communicative language and the written language with the input for language learning. Taking the way it is instructed into consideration, vocabulary can be classified into productive (active) or receptive (passive) (Finocchiaro, 1958). In short, it seems clear that these distinctions are highly appealing to L2 contexts as they help teachers make decisions on what vocabulary terms to include in the second language instruction.

3.2.2. Core Vocabulary / Non-core Vocabulary

As the term indicates, ‘core vocabulary’ includes words that are more fundamental in a language since they are more frequent and versatile. According to McCarthy (1990: 158), it “collocates more readily with wide range of words, they may be used in a wider range of register, and are usually involved in the definition of non-core members of their set”. With respect to L2 learning contexts, these differences are quite significant because once core vocabulary is well planned and organised, “we could use it in virtually any situation, whether spoken or written, formal or informal, or any situation where an absolutely precise term, the ‘mot juste’ might be elusive and where a core word would do” (McCarthy, 1990: 49). In a sense then, more core vocabulary tends to be high in frequency, neutral in formality, applicable in various topics and environments and can be even used to represent or define other low frequency words.

3.2.3. Discourse Structuring Vocabulary / Procedural Vocabulary

Discourse structuring vocabulary or “anaphoric nouns” refer to words that function to create abstract lexical relations in discourse. They are mostly found in academic prose and newspaper articles (Jiangwen & Binbin, 2004: 61). Accordingly, this type of vocabulary is used to connect language to the context in which it occurs. This stresses the need to focus on this type of vocabulary as it has various implications on vocabulary teaching and learning, in addition to teaching English for academic purposes. Procedural vocabulary, however, is described by Widdowson (as cited in McCarthy, 1990) as being used to paraphrase, define or locate items within their fields and organise them in discourse. This indicates that L2 learners would better infer meaning and connect sense with denotation to enlarge this vocabulary.

3.2.4. General Service/Academic Word Lists and Technical/Low Frequency Words

Dudley-Evans & St John (1998) suggest classifying vocabulary into two broad areas: vocabulary used in GE, yet frequently used in technical contexts and the vocabulary of specialised disciplines. However, the most well-known description of vocabulary categories would be the one provided by Nation (2001) who identifies four types: The General Service List (GSL), Academic Word List (AWL), Technical Vocabulary and Low Frequency Words.

The first type is constructed by the most high frequency words of English. It includes virtually all functional words of English (around 176 word families), but by far the majority of these high frequency words are content words (Nation, 2001). Schmitt (2000) believes that these words are to be taught and dealt with by L2 learners explicitly because they are significant in constructing further learning.

The second type is labelled ‘academic word list’, ‘academic vocabulary’, ‘sub-technical vocabulary’ or ‘semi-technical vocabulary’. As Baker (1988: 91) explains, they are “items which are neither highly technical and specific to a certain field of knowledge nor obviously general in the sense of being everyday words which are not used in a distinctive way in specialised texts”. Coxhead (as cited in Chung & Nation, 2003) asserts that this vocabulary is made up of 570 word families which are found in a wide range of academic texts directed for learners with academic purposes but not restricted to a specific discipline. It can be considered as a specialised extension of high frequency words useful in areas of humanities, law, science, business, etc. Marshall & Gilmour (as cited in Hirvela, 2013) suggest that for learners to acquire this vocabulary, teachers must focus more on pre- reading activities and extensive reading instead of lists of technical terms. So, they can be better presented as they appear within the context of the lesson.

As for technical vocabulary, it is said to include words occurring frequently in specialised texts or subject areas (Nation 2001). Becka (as cited in Sutarsyah, Nation & Kennedy, 1994) defines technical vocabulary as the one that is particularly used in specific content area and rarely being used outside these fields. He claims that it is of two sub-divisions. The first being words that are frequently encountered in specialised texts and used less in GE. The second, in contrast, contains words that occur frequently in the specialised text and don't exist in the general academic corpus. In other words, this vocabulary is largely of interest and use to people working in specialised fields and to learners of ESP. Owing to this, teachers must extensively address technical content vocabulary words in vocabulary instruction especially with the use of examples and definitions.

The fourth type of vocabulary, which is constituted of all the remaining words of English, is called the low frequency words (Chung & Nation 2003). These vocabulary items can be typically found in any reading passage and they assist learners to understand texts. In relation to language classrooms, such words can receive little attention and time as they are not meant to be the focus of instruction since they are often regularly acquired.

3.3. Vocabulary Instruction

3.3.1. Teaching and Learning Strategies

Nation (as cited in Schmitt, 2000) admits that there is no clear understanding of mechanics of vocabulary acquisition. Still, various studies try to provide models to explain how learning occurs, what strategies are used, and how learning words is associated with other already learnt words.

Maronpot (1951), for instance, criticises traditional methods of vocabulary teaching in that they focus on the memorisation and repetition of merely isolated terms that are not to be

retained and remembered since they are not associated or put into practice by learners. As a matter of fact, vocabulary tasks and techniques are restricted to blind matching of words with their equivalents without necessarily understanding the relation between these terms and the way they are used in real contexts. To account for this, it is important to learn about collocations used in different contexts. Ur (1991) attributes the learning of words with other broader aspects in addition to collocations namely: form, grammar, meaning and word formation.

Therefore, it goes without saying that teaching vocabulary is more than presenting new words to learners. As a matter of fact, they rather need to learn how words work together to perform meaningful communication. Subsequently, empirical studies reveal that there are basically two methods in teaching and learning vocabulary: incidentally or otherwise intentionally.

3.3.1.1. Incidental Vocabulary

To Ellis (1994: 219), "An implicit vocabulary learning hypothesis would hold that the meaning of new words is acquired totally unconsciously as a result of abstract exposures in a range of activated content". This means that L2 learners are supposed to process vocabulary terms naturally and implicitly without being intentionally aware or pushed towards the learning of these words. Hence, they are allowed to deal with any L2 input by themselves indirectly from classroom context (Laufer & Girsai, 2008). Schmitt & Schmitt (1995: 135) in their processing hypothesis state that "mental activities which require more elaborate thought, manipulation or processing of a new word" through contextual guesses instead of unrelated wordlists "will help in the learning of that word". Armbruster *et al*. (2001) argue that L2 learners need to encounter vocabulary implicitly through conversation with others, listening to books read aloud to them, and through reading extensively on their own. Further strategies are

provided by other researchers as multimodal glosses, extensive listening, the use of technology-based methods, and problem-solving group work (Cunningham & Stanovich, 1998; Hiebert & Kamil, 2005; Nation & Waring, 1997; Restrepo Ramos, 2015). To sum up, words are more effectively acquired and retentive when learners are exposed to materials, which allow them to hear and see words used in different contexts by being engaged in particular cognitive processes.

3.3.1.2. Accidental Vocabulary

Accidental vocabulary implies that words' learning is not embedded into materials; instead, learners are explicitly informed about the purpose of the instruction. "… an explicit vocabulary learning hypothesis would hold that there is some benefit to vocabulary acquisition from the learner noticing novel vocabulary, selectively attending to it, and using a variety of strategies to try to infer its meaning from the context" (Ellis, 1994: 219). Direct instruction helps learners learn difficult lexical items such as words that represent complex concepts that are not part of the learners' everyday experiences (Armbruster *et al*., 2001). It is also assert that these direct instructions include two concepts. First, the word meanings are learnt by students thanks to the provision of specific word instructions stressing on individual words, which go along with real life contexts. Second, they are said to help learners acquire word-learning mechanics because specific word instructions cannot be done with all the unknown words. These strategies include: using dictionaries, reference aids, part of word information, contextual clues, paraphrasing, understanding meaning through synonyms, word lists, contrastive analysis of the target words and L2 word memorisation (Armbruster *et al*., 2001; Ghobadi, Shahriar & Azizi, 2016; Kourilova, 1979).

Schmitt (2000) assumes that teachers, however, should incorporate both implicit and explicit methods in the teaching of vocabulary. He further explains: "explicit teaching can

supply valuable first introductions to a word ... varied contexts in which learners encounter the word during later incidental meetings can lead to broader understanding of its collocations, additional meaning senses, and other higher-level knowledge" (Schmitt, 2000: 137). It is worth noting, that for the vocabulary instruction to be effective, it is essential to implement explicit and incidental teaching approaches altogether in the L2 classroom.

3.3.2. Testing Vocabulary

The procedure of evaluating learners' performance is a key component of any L2 course. Through a well constructed test, teachers tend to examine the efficiency of the course and highlight learners' strengths and weaknesses. As far as vocabulary is concerned, it is maintained that vocabulary needs to be evaluated for it is necessary to conduct reading, to get an overview about learners' abilities, and to shape opinions about the flow of the course (Schmitt, 2000).

Vocabulary tests are very often set for several purposes. Achievement tests are designed to check how well learners acquire the target vocabulary as a result of the course. Diagnostic tests, on the other hand, help identify learners' weaknesses before instruction takes place so as to be targeted during the course. By placement tests, Schmitt means activities which aid classify L2 learners into corresponding levels. The last type is labelled proficiency tests which indicate the size of vocabulary and, thereby, the proficiency level. Schmitt argues that to establish a well-designed test, teachers must identify many factors such as: "What words do you want to test?", "What aspects of these words do you want to test?", "How will you elicit learners' knowledge of these words?". Additionally, he suggests that having determined why and what to test, teachers need to decide upon the 'how' to achieve their goals. Accordingly, learners can be set to exams 'receptively' where they just recognise vocabulary items in formats (like true/false, multiple choice questions (MCQs) and matching)

or “productively” where they need more control over the knowledge of these terms in formats (like synonyms, definitions or fill in the gaps). Moreover, L2 teachers can either evaluate the size of vocabulary, which is restricted to measuring the meaning (i.e., ‘breathe of knowledge’), or the extent to which learners acquire this vocabulary (i.e., ‘depth of knowledge’). Furthermore, vocabulary tests can either have a “verbal form” as in dictation and interviews or a “written form” where vocabulary can be measured separately or in relation to other skills like reading and writing (Schmitt, 1994: 10-11).

Read & Chapelle (2001), in contrast, cited Read’s (2000) proposal of the three dimensions to be focused on as shown in the following figure:

Discrete A measure of vocabulary knowledge or use as an independent constrict	<.....>	**Embedded** A measure of vocabulary which forms part of the assessment of some other, larger construct
Selective A measure in which specific vocabulary items are the focus of the assessment	<.....>	**Comprehensive** A measure which takes account of the material (reading/listening tasks) or the test
Context-independent A vocabulary measure in which the test-taker can produce the expected response without referring to any context	<.....>	**Context-dependent** A vocabulary measure which assesses the test-taker’s ability to take account of the contextual information in order to produce the expected response

***Figure 1.5*. Dimensions of Vocabulary Assessment (Read as cited in Read & Chapelle, 2001: 5)**

Obviously, Read & Chapelle (2001) stress the need to assess learners’ ability to understand the semantic and pragmatic characteristics of vocabulary words in different contexts (collocations) and their use. Hence, they assert that if vocabulary tests are to be valid, they must be selective and context-independent (like in yes/no and word associates exercises). They should also embed comprehensive and context-dependent standards that evaluate

vocabulary cognition and use. To assess receptive skills, tests must involve exercises of contextual meaning while for production skills; they need to include scope and appropriateness of vocabulary use.

3.4. The Role of Vocabulary in ESP Courses

Harmer (1991: 153) states, “If language structures make up the skeleton of language, then it is vocabulary that provides the vital organs and the flesh”. As far as ESP is concerned, Coxhead (2013) indicates that ESP vocabulary resembles technical, sub-technical, specialised lexicon associated to particular academic areas or professional disciplines. He adds that vocabulary is essential since teachers and learners must know the words related to their specific field and practice them along with the key ideas of these areas so as to feel that they belong to a specific group. “This point is particularly important if learners are to become fully fledged members of a particular community” (Coxhead, 2013: 116).

Besides, Nation (2001) asserts that people with less vocabulary are necessarily with less vision, and less future opportunities. Therefore, the importance of vocabulary in the academic world must be acknowledged since there is no way of making advance in a new language without building and developing lexicon. Still, it is essential in work place contexts as well (Ray Graham & Walsh, 1996). Indeed, learners use items they previously learnt in vocational institutions into professional situations. In short then, vocabulary is a key element to ESP instruction since it is central to communication in academic and work place situations.

3.5. The Teaching of Vocabulary in ESP

The teaching of vocabulary is the main concern in ESP courses. Yet, it is a more challenging process than that in GE because of the specificity of specialised lexical terms (Wu, 2014). According to Williams (as cited in Hirvela, 2013), vocabulary instruction in ESP

must be natural and non-determined by the teacher. He ,therefore, suggests some learning strategies like inferring from context, identifying lexical familiarisation, unchaining nominal compounds, synonyms search and word analysis.

Nevertheless, Dudley-Evans & St John (1998) argue that for teachers to proceed in ESP instruction, they must first distinguish between the vocabulary, which is necessary for comprehension, and that needed for production. To them, the former involves deducing the meaning from the context and the latter requires word storage and retrieval. Consequently, they propose a framework which involves cognitive processing strategies such as situational/ semantic/ metaphor techniques, collocation, as well as the use of corpora, and lexical phrases.

Nattinger (as cited in Dudley-Evans & St John, 1998) suggests that the use of word meaning is the key to successful retrieval aided by the grouping of words. This may be presented according to topics (situational sets) or according to chains of association (semantic sets) or even aided by metaphor. These techniques can be widely implemented by teachers as well as learners to help them build their own vocabulary sets, especially with notions such as cause and effect, measurement, and quality with structure.

In ESP contexts, the development of corpora of specific texts as a tool for teaching vocabulary also provides the opportunity to draw up lists of key lexical items and examine their context and how they collocate with each other (Scott & Johns as cited in Dudley-Evans & St John, 1998).

As suggested by Peters (1983), learners do not store vocabulary as individual words but also as chunks of language. Indeed, when learners have a limited need for English in certain predictable situations, the learning of key lexical phrases can help achieve the proficiency required from these situations.

Conclusion

As a conclusion, since it is proved to have a major role in language acquisition, vocabulary has been opted for to be investigated in this study. In this chapter, vocabulary instruction is linked with the teaching of ESP using the deep-en methodology. To this end, origins of ESP are traced and its distinction from GE is studied in addition to its detailed definitions. Equally important is stating the fields that go under the umbrella of ESP and counting its teaching options mainly genre-based and deep-end approaches. The latter, which is the interest of this research, focuses on the performance of communicative tasks instead of restricting instruction to texts of different genres. This is why it is thoroughly discussed in the second section. We have also provided a distinctive outline in order to clarify the use of the deep-end in ESP instruction along with the most compatible materials with this methodology. Finally, the topic of vocabulary is tackled into details starting by giving its definitions. After its kinds are counted, the techniques and strategies of instruction are examined in relation to ESP contexts.

In sum, the main issues in implementing the deep-end methodology in an ESP course to teach vocabulary are tackled in this chapter of literature review. The second chapter, however, is to consider into details the practical framework for this research.

CHAPTER TWO

IMPLEMENTATION OF THE EXPERIMENT AND EVALUATION OF RESULTS AND FINDINGS

Introduction

After having discussed some literature in the previous chapter about the issue of teaching vocabulary in relation to ESP methodologies, this chapter aims at investigating the impact of using the deep-end methodology in ESP courses to improve students' vocabulary.

According to Mikkelsen (2005:130), "Research is about knowledge production seeking answers to questions through inquiry". She assumes that any study must be based on concrete and measurable data rather than on abstract notions. This indicates that after data is collected to elicit information about the problem at hand, results are analysed and finally interpreted. In this context, many methods of investigation can be used such as: statistical studies, cases, pilot studies, scenarios, experiments, etc. As far as the present study is concerned, an experiment has been conducted to test the research's hypotheses and answer its questions. Therefore, this experimental study is divided into three stages: a pre-test (see Appendix I) to diagnose students' level in vocabulary, a treatment to make the difference between the control and experimental groups (see Appendices III, IV, V and VI) and a post-test (see Appendix II) to detect any growth in their abilities.

In this chapter then, the population and the sample are to be presented in addition to the content of the tests and the experiment which are explained into details. This part of the research is also devoted to report procedures of analyzing and interpreting the results obtained in the pre-test and the post-test of both the experimental group (see Appendix VIII) and the control group (see Appendix VII). The former group receives a treatment following the deep-

end methodology during four sessions of one hour and a half whereas the latter group is taught with the genre-based method. This helps discover whether the implementation of the deep-end methodology in teaching ESP could help students of the experimental group acquire specialised vocabulary items. As a result, a comparative analysis using the mean and standard deviation scores is necessary to compare the participants' achievements in both tests to find out which group perform better. Furthermore, the hypothesis will be statistically tested through running a t-test by the calculation of some basic descriptive statistics.

1. The Population and Sample

The sample in this study constitutes two groups of first year Master students in the Department of Biology, Faculty of Sciences and Technology at Boussouf University Centre of Mila. They are specialised in a specific field of research which is 'Vegetal Biotechnology'. Both groups: the experimental and the control group consist of fifteen students. Therefore, participants involved in the current research include 30 students among the whole population of 59 students.

Participants enrolled in this study are supposed to have adequate English background since they have been studying EGP for at least six years and ESP for at least three years. These data are clearly represented in the table below:

	Number	**Percentage**
Control group	15	25.42%
Experimental group	15	25.42%
Total of groups	30	50.84%
Whole population	59	100%

Table 2.1. ***Distribution of Sample Groups***

The table 2.1 shows the distribution of the sample group including the control group and the experimental group as compared to the whole population of study.

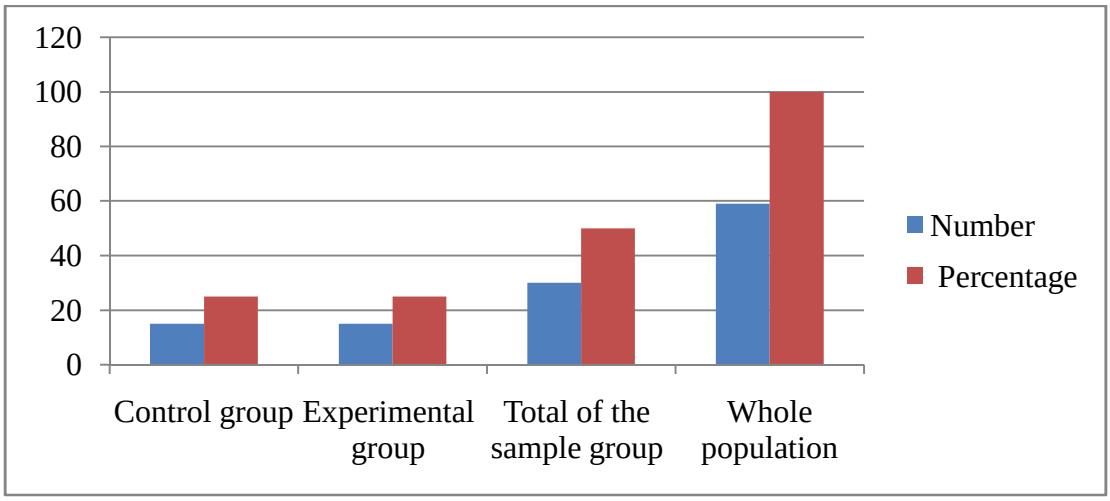

Figure 2.1. **The Control and Experimental Groups**

As shown in the figure above, the sample group represents more than half (50.84%) of the whole population of first year Master students specialised in the field of 'Vegetal Biotechnology'. Thus, the control group, as well as the experimental group, constitutes quarter of the target population each (25.42%).

2. Procedures of the Experiment

The scheme shown in the figure 2.2 provides a detailed framework of the experimental study. It summarises the procedure that outlines this research including the stages of the pre-test, the treatment and the post-test. This is actually to determine the extent to which the deep-end methodology contributes to the growth of ESP students' vocabulary.

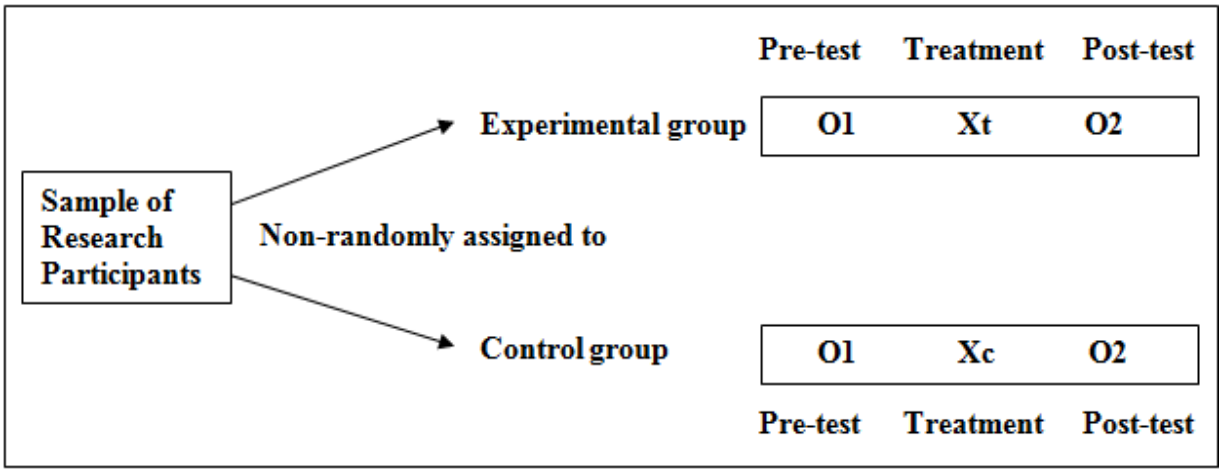

***Figure 2.2*. Design of Pre-test/Post-test of Control/Experimental Groups (Johnson & Christensen, 2004: 283)**

In this figure:

- **O1** and **O2** represent the assessment of the dependent variable in the pre-test and post-test.
- **XT** stands for the experimental treatment condition.
- **XC** stands for the control treatment condition.

In the current research, a pre-test allocated for an hour and half was administered to both groups (control/experimental) at the same time on February 5th, 2018. In order to ensure credible results, we insisted on them to avoid any kind of help from peers, smart phones or dictionaries. Both groups, then, dealt with the same topics but with different methodologies. The experimental group received a treatment using the deep-end methodology which was scheduled in the first semester for an hour and half in each session. The lectures and materials these students were exposed to are designed to meet the communicative skills we opt to foster in them according to this approach. The control group, however, were taught regularly by another teacher according to the traditional genre-based method. Finally, following the

experiment which lasted for four weeks (6 hours), a post-test was administered to both groups on March 12th, 2018.

2.1. The Pre-test

The pre-test is regarded as a diagnostic tool to determine the actual proficiency level of students before encountering the control and experimental treatments. In respect to this study, all participants (n=30) involving both control and experimental groups were given hand outs of the pre-test and asked to accomplish it individually and silently in approximately 1h 30 (see appendix 1). Additionally, any use of dictionaries, and other materials to check the meaning of words was disallowed to guarantee the credibility of the test results. The pre-test contains four exercises ranging in difficulty from the easiest to the most difficult. Two of them (Exercises 1 and 2) are intended to assess vocabulary recognition abilities, and the other two activities (Exercises 3 and 4) aim at checking the vocabulary production skills. Each of these activities contains three items that are consistent with the context since "the dominant communicative approach to language teaching and testing calls into question the notion that de-contextualised learning of language forms is the basis for effective proficiency development in a second language" (Read, 2007: 114).

The objective of exercise one is to determine the participants' prior knowledge of scientific English vocabulary. Learners are provided with a list of scientific terms that are asked to match with their corresponding categories. In addition to background knowledge, comprehension and contextual guessing skills are assessed in the second activity. In this exercise, the learners are required to read the passage about 'the applications of Modern Biotechnology' to be able to answer MCQs. The third one, however, is designed to check affixation and word derivation skills. Participants are supposed to form new words (nouns and adjectives) to complete the table and then, use these items to fill in the gaps in the paragraph

about ‘Herbicide tolerance’. The last exercise is associated with the production of words to fill in the gaps in a passage about ‘Genetically Modified Foods’.

2.2. The Treatment

In the phase of the treatment intervention, which lasted for four weeks, the dependent variable (vocabulary) has been approached within two conditions. Students of ‘Vegetal Biotechnology’ involved in this study, therefore, process the experiment materials differently.

On the one hand, in the experimental condition, students received ESP courses throughout the use of deep-end methodology. Hence, they have been pushed to the deep-end to make them use their potentials to the maximum by performing a communicative task with minimal preparation. Next, the flow of instruction was highly determined by their strengths and weaknesses while they carried out these communicative tasks. In other words, the following steps of the lesson depended on how well the students achieved in the performance task. We need also to count on the use of authentic materials that are specific to their field of research (Vegetal Biotechnology) including: figures, texts and videos. Likewise, it is worth noting that strategies of cooperative learning are implemented to help students pay attention to various experiences while accomplishing tasks and improve their achievements.

In a way then, participants in the experimental group were encouraged to interact within a learner-centred setting so as to promote their autonomy. Most importantly, this is done to familiarise them with real world communicative situations either academic or occupational. To this end, vocabulary items, patterns and structures were basically taught implicitly (inductively) and sometimes explicitly (deductively). This is because both language usage and use are important to improve the communicative competence and vocabulary. To

sum up, the experimental sample were meant to acquire scientific and technical lexicon while simultaneously being involved into communicative tasks.

On the other hand, the course content, that the control group students were exposed to, deals with similar topics processed by their counterparts in the experimental group (Genetically Modified Foods, Photosynthesis, Phyto-chemical Techniques and Hybridisation). Yet, unlike the experimental condition which followed the 'deep-end methodology', the control condition presents these courses to students using the 'genre-based approach'.

The focus of this traditional approach is to enable ESP students to handle texts with various types of discourse and register. Hence, the control group students were supposed to analyse these scientific texts, articles and reports before they practice drilling activities. These tasks aim at developing vocabulary comprehension, synonyms, antonyms, definitions, and word derivation skills. In other words, this approach does not emphasise on developing communicative skills among ESP students to prepare them to face real life situations they may encounter in the future.

2.3. The Post-test

The post-test, which is the final stage in this experimental procedure, serves to measure the growth of the students' vocabulary capacities. It, therefore, helps to check to what extent the study's control and experimental treatments have been beneficial for them. It is worth mentioning that the post-test in this research is to be similar to the pre-test in terms of length, type, number of questions, and type of required information. Yet, it is more challenging in terms of the level of difficulty. This helps avoid any inconvenience that would affect the participants' performance leading to less reliable and inadequate results. In other

words, its pattern should mirror that of the pre-test as much as possible to ensure a reliable comparison of the students' achievements in both tests.

Following a treatment that lasted for four weeks, all participants (n=30) (both control and experimental groups) undertook the post-test (see Appendix II) for an hour and half in conditions that are identical to those of the pre-test to make sure the results obtained are reliable. Moreover, similar to the pre-test, it is structured into four exercises holding three vocabulary items each. Two exercises are directed to evaluate word recognition while the two other activities aim at examining the word production skills. They are also graded according to their level of difficulty from the least to the most difficult.

The first exercise aims at finding out how well participants in this study acquired vocabulary related to their special field of research during the phase of treatment. To this end, they are expected to classify each technical term from the list under three categories unlike the first exercise in the pre-test where all these items were already organised into three lists. In the next exercise, learners' comprehension and guessing techniques are assessed by asking them to match words from a passage about the 'structure of DNA' with their corresponding definitions. This activity is more challenging than the one in the pre-test because the former offered only one possible answer with an extra misleading definition whereas the latter proposed multiple answers. As far as the third exercise is concerned, the students are equipped with a text about 'hybridisation' and then asked to complete the table with words they form using suffixes and prefixes. Finally, while students in the fourth exercise of the pre-test were supposed to fill in the gaps in a paragraph using their own words, they are similarly required to interpret a figure about the 'process of photo-synthesis' and then fill in the gaps with the missing legends in the post-test.

3. The Content of the Experiment

In this experiment, series of lessons are gathered from various sources. They are assumed to help students develop comprehension and enrich lexis of general and technical terminology. For this to happen, a variety of materials are used with both groups: the control group and the experimental group. The control treatment following the genre-based approach requires the implementation of materials such as scientific texts and reports.

However, the deep-end methodology used to teach the experimental group is not limited to using texts only. Instead, it necessitates the use of varied materials as specialised articles, figures, software and videos so as to meet the learners' communicative academic and occupational needs and goals. These materials are, therefore, designed based on their relevance to students' interest and need, and adequacy to their level and field of specialisation. Moreover, it is worth mentioning that the vocabulary is not taught in isolation. All language skills are rather combined and integrated in the instruction of the experimental treatment:

- Reading: a specific text is introduced to the students for skimming/scanning, for gist/particular information and for encountering general/technical vocabulary terms.

- Speaking: open discussions, group work for solving problems and oral presentation in their specific field of research.

- Listening: listening to teachers' and students' talk and listening to a video

- Writing: note taking, writing activities and summarising.

The table 2.2. outlines the sample courses which were implemented in this study:

Lecture	Key Topic	General Aims	Language Functions	Language Points	Skills/ Strategies
1	Genetic Engineering	- Developing the understanding of others' thoughts and beliefs - Raising awareness about issues related to transgenic crops. - Interpreting figures and illustrations - Writing a scientific article	- Expressing opinion - Debating - Agreeing - Disagreeing - Reading figures - Describing	- Irregular plurals of scientific terms. - Present simple tense - Conjunctions of cause/result - Verbs of opinion - Technical terminology	- Joining a chat room to discuss a given topic - Defending/ responding to opinions. - Reasoning - Critical thinking and judgment - Writing an expository article

2	Photo-synthesis	- Exploring the benefits of CALL in classroom - Reading figures and illustrations. - Expressing chronological order - Reading a scientific text for gist/ details - Building words - Writing a summary	- Reading figures - Describing - Comparing - Contrasting - Forming words - Forming opposites - Analyzing - Affixation - Reporting a process - Sequencing	- Using adjectives - Comparatives and Superlatives - Negative prefixes - Suffixes - Time sequencers - Present simple tense	- Using a software to fix scientific problems - Responding to a text - Skimming - Scanning - Analyzing a text - Synthesising - Writing a summary - Forming words

3	Phyto-chemical Techniques	- Developing interest in Phyto-chemistry and its industrial applications - Responding to a video - Listening for gist/ details - Making hypotheses - Reporting an experimental procedure - Expressing time - Writing a laboratory report	- Sequencing - Instructing/ prescribing - Listening for gist / for details - Taking notes - Describing - Expressing quantity - Deducing	- Conjunctions of time - Present simple tense - The imperative - Prepositions of direction - Quantifiers - Present Participles - Vocabulary connected with time	- Expressing time relations - Recognising technical vocabulary - Responding to figures/graphs - Listening for gist - Listening for details - Writing a report of an experiment

4	Hybridisation	- To make a good scientific presentation - Delivering an oral presentation - Discussing a scientific topic - debating/ refuting an argument - Commenting on others' presentations - Questioning ideas/ facts/ opinions	- Describing preceding/ simultaneous/ following events in a procedure - Designing - Summarising - Comparing - Contrasting - Defining - Asking questions	- Present simple tense - Technical/ semi-technical terminology - Adjectives - Forming questions	- responding to conferences - Preparing a scientific research - Present a research orally - Paraphrasing

Table 2.2. ***Summary of the Sample Lessons Implemented in the Experiment***

After having given a hint about the sample lessons, which were assigned to the experimental group as shown in the table 2.2, it is necessary to explain into details the rational and the procedures of the instruction tasks.

3.1. Lesson N° 1 (Genetic Engineering) (see Appendix III)

3.1.1. General Aims

- Improving the skill to discuss a scientific topic in relation to students' specific field of research with each other and with native speakers as well.

- Using synchronous and asynchronous communication to develop one's technical and semi-technical vocabulary terms.

- Reading and responding to pictures, figures, graphs, diagrams, tables, illustrations and charts.

3.1.2. Objectives

By the end of the lesson, learners will able to:

- Express opinion and run a debate about benefits and limitations of the modern agricultural techniques and transgenic crops.

- Form the plural of scientific technical terms.

- Write an expository scientific article about the advantages of the genetic modified foods (GMFs) using the present simple tense to explain facts.

3.1.3. The Instruction

Task 1

Students in the experimental group were engaged into a communicative task with no brainstorming or warm-up, and encouraged to join a chat room at (chatzy.com). They were already provided with the username and password to gain time. Actually, some administrative issues were encountered since language laboratories were not equipped with an electronic network. To overcome this problem, the students had access to this website using their smart phones after sharing the connection with them via Wi-Fi. Once connected to the chat room, the teacher attempted to direct the debate towards tackling the issue of advantages and disadvantages of 'transgenic crops', but at the same time trying not to overwhelm the discussion. Unfortunately, no native speakers were connected to the chat room during the time of the assignment. Still, it was clear that the students found the task interesting and fun.

In a sense then, by accomplishing this activity, students were supposed to practice unintentionally verbs and grammatical constructions used to express opinion. They were also required to make use of strategies of agreement/disagreement, defending one's point of view with arguments, and most importantly, techniques of managing a debate.

Task 2

The teacher provided the students with handouts which contain a figure showing a plant cell and had them to consider it and answer the questions (a-d). Learners were required to interpret the figure and fill in the gaps with appropriate legends. After that, the teacher attempted to guide them to talk about the functions of these components in metabolism, respiration and reproduction. This, in fact, helped to give a clear impression about whether they are able to use the plurals of these terms correctly or not. Next, these learners were

expected to complete the table with words either in the singular or plural forms. The items mentioned in the table represent technical vocabulary related to different parts of the plant's cell, and were extracted from the figure itself. After that, the teacher drew the learners' attention to the irregular plurals, and helped them deduce their rules and use them into examples of their own words. Furthermore, the aim of questions (c-d) is to introduce the students to the topic of 'genetic engineering' and 'gene transfer' to enable them to conduct the next assignments.

Task 3

After having an idea about the topic of genetic engineering in the previous tasks, the teacher asked the students to read the statements (a-f). Then, they were supposed to classify them in a table that summarises the pros and cons of the GMFs with reference to 'environmental', 'economic' and 'food safety' issues.

Task 4

In the production phase of the instruction, the learners were assigned to make use of the notes obtained from the table in the third task in addition to the ideas discussed in task 1 and 2 in order to write a scientific essay about the benefits of GMFs. The teacher, hereby, attempted to direct the students' attention to consider the layout of an expository article, and get them use the present simple tense to explain facts and ideas in their essays.

3.2. Lesson N° 2 (The photosynthesis) (see Appendix IV)

3.2.1. General Aims

- Raising awareness in using CALL to teach/learn technical vocabulary items.

- Reading and responding to scientific texts and articles.

3.2.2. Objectives

By the end of the lesson, learners will be able to:

- Use scientific software/ programs/applications to yield information about molecules of proteins and enzymes.

- Read a text for gist and analyse it for specific details.

- Derive new words with different grammatical categories using suffixes.

- Form opposites of words using prefixes.

- Use time sequencers to explain a chronologically ordered process.

- Summarise a scientific article.

3.2.3. The Instruction

Task 1

Students of the experimental group were involved into a communicative task with minimal preparation where they had to use the 'RasTop' software to generate information about the molecule of 'chlorophyll'. Because the language lab was not available the day of assignment, we had to set up this program on learners' PCs and get them to conduct the task in groups. The software they manipulated is an open-source under the GPL licence. In addition, it is adapted from the program RasMol that is initially developed by Roger Sayle. It is basically designed for the rapid analysis of macromolecules and molecular visualisation.

Hence, using this software's extended menu and command panel, the students were asked to open the chlorophyll molecule and answer the questions (a-c) accordingly.

To sum up, this active engagement is intended to expose the students to new technical vocabulary terms. In this way, they are expected to acquire technical and semi-technical items incidentally through indirect exposure and manipulation of this lexicon by using the 'RasTop' program.

Task 2

According to Stahl (2005), students need to encounter the word more than once in different situations to be firmly placed in their long-term memory. This instruction, therefore, provided the students with the opportunity to interact using words related to the molecule of chlorophyll repeatedly, and in more than one context. For this, they were supplied with a text in addition to the program they manipulated previously in task 1.

Students were asked to read a scientific article about 'the chlorophyll' and its function in converting the radiant energy of the sun into a chemical one through the process of 'the photosynthesis'. The experimental group had to read first the passage for gist to answer the MCQ (a). Then, they were directed to reread it for details to complete the table in question (b). These information are about the various chemical reactions related to the steps of photosynthesis, reactants and products of these reactions as well as the exact area in the 'chloroplast' of the plant where they occur. Next, the teacher got them to scan the text to find out words that are opposite in meaning to the ones provided in question (c), and directed their attention to the prefixes used to form these opposites. In question (d), students tended to complete the chart with words they derived using suffixes.

Task 3

After skills of skimming and scanning were imparted to students in the second task, they were expected to practice summarising techniques in this one. For this goal to be achieved, the teacher got these students to employ all the information they processed earlier in previous activities to explain the biochemical reactions occurring in the photosynthesis. They also had to point out their chronological order and at the same time create cohesion by using time sequencers.

3.3. Lesson N° 3 (The Phyto-chemical Techniques) (see Appendix V)

3.3.1. General Aims

- Developing interest in Phyto-chemistry and its industrial applications.

- Listening and responding to a video about a biology experiment.

3.3.2. Objectives

By the end of the lesson, learners will be able to:

- Describe a continuous procedure, consisting of steps and events by expressing time relations between actions through prepositions, conjunctions and link words.

- Listen to a video for gist and for details to take notes.

- Writing a lab report

3.3.3. The Instruction

Task 1

In this task, the participants were required to work in pairs and consider the pictures which represent the procedures of a biology experiment. The latter is conducted in a laboratory to extract and test the amount of 'Phosphatase' enzyme in germinating seeds of plants. The teacher then, asked them to put these steps into the correct order. By doing so, the students were driven to the deep-end as they were supposed to interact with each other and carry out an assignment cooperatively without being prepared to. By accomplishing this task, they were told to report an experiment making use of time sequencers, conjunctions of time and appropriate tenses of verbs. Finally, in an open class discussion, groups shared their answers to each other and tackled the steps involved in the extraction protocols of medicinal and aromatic pants in general and the choice of solvents used in these procedures.

Task 2

After dealing with the topic of traditional methods as well as modern techniques of substance extraction in general in the former task, the students were introduced particularly to the extraction of 'Amylase' enzyme in this task. They also talked about its significance to the environment as it is degradable, and can be naturally produced with biological sources and about its applications in modern industry. The teacher, next, encouraged them to watch the video and take the quiz about this enzyme by answering MCQs.

Task 3

In this task, experimental group students tackled the issue of enzyme isolation using phyto-chemical techniques. They were supposed to watch again the video for details and take

notes to be able to combine the steps of the above mentioned procedure in column A with their corresponding parts in column B with the connectors provided. The objective, hereby, is to enable the students to use conjunctions of time, and describe a procedure consisting of steps and events.

Task4

At the end of the lecture, the students were intended to write a report of an experiment. Using the ideas already discussed about methods and procedure of extraction of Amylase in task 3, they were told to write a lab report about the experiment of extracting and identifying β- Amylase from sweet potatoes. They could also make use of the summary tactics in the handouts to process their writings (see Appendix VI). It summarises the lab report format including sections of: the title, introduction, materials and methods, results and conclusion

3.4. Lesson N° 4 (Hybridisation)

3.4.1. General Aims

- To make a good scientific presentation

- To respond orally to conferences

3.4.2. Objectives

By the end of the lesson, learners will be able to:

- Prepare and deliver an oral presentation discussing a scientific topic.

- Debate, question ideas and comment on others' presentations.

3.4.3. The Instruction

First of all, students had to prepare a successful presentation. By doing so, they practice strategies of planning by thinking about who the audience is in addition to what is the topic and what is its purpose. After that, they got it organised into opening, body and closing parts including illustrations. When presenting the information about hybridisation, the students were obliged to attract listener's attention, share ideas and opinions and finally explain details to convince the audience of the key points tackled. They are engaged, then, into an open class discussion by asking questions, making comments, suggestions, etc.

4. Analysis of Results and Findings

As mentioned earlier, scores of participants (n=30) obtained in the pre-test and post-test were recorded and compared to each other. These scores were submitted to the Standard Deviation analysis (SD) since it "is considered as the most useful index of variability" in a distribution or group of scores (Hamilton 2007: 4). Thus, descriptive statistics of the control and experimental groups in both tests were computed, introduced, and analyzed in this part.

4.1. Quantitative Results of the Pre-test

Before conducting the treatment, data of the pre-test was recorded (see Appendix VII and Appendix VIII). These findings are to be presented and thoroughly analyzed.

4.1.1. Scores of the Control Group in the Pre-test Exercises

The control group's answers obtained from each activity of the pre-test are, herby, exhibited and analysed:

Pre-test exercises	Scores	Frequency	Students' general mean in the exercise
Exercise 1	3	15	3/3
Exercise 2	2 3	13 2	2.13/3
Exercise 3	0 1 2 3	1 1 10 3	2/3
Exercise 4	0 1 2	8 6 1	0.53/3

Table 2.3. ***Control Group Scores in Pre-test Exercises***

Taking into account that the four exercises of the pre-test include three items marked on one point, each one of these activities as whole is scored on 03 points out of 12. As shown in the table, the scores gained by the participants of the control group and their frequencies (representing the number of students who scored the same) vary in each activity. This is actually due to the fact that they were intentionally arranged in terms of difficulty depending on Bloom's Taxonomy and Schmitt's word recognition/production abilities as well as Read's dimensions of vocabulary knowledge and use. Accordingly, in the first activity, which aims at checking knowledge and remembering, all the students answered correctly. As for the second and third ones, which evaluate word recognition, understanding, applying and analyzing, most of the participants scored well (2 – 3 points) with a general mean of (2.13 – 2). However, it seems clear that the control group scored below the average (mean of students = 0.53/3) with

only one student having the mark 2 in the last activity which is supposed to measure the ability of creating and producing words.

The results indicate that the control group participants (n=15) are somehow familiar with some technical and semi-technical terms related to their specific field of study (Vegetal Biotechnology). This can be attributed to their level (first year Master students). It is obvious also that they are of limited experience in comprehending and recognising words in context. Yet, they have serious difficulties in forming and producing new vocabulary items.

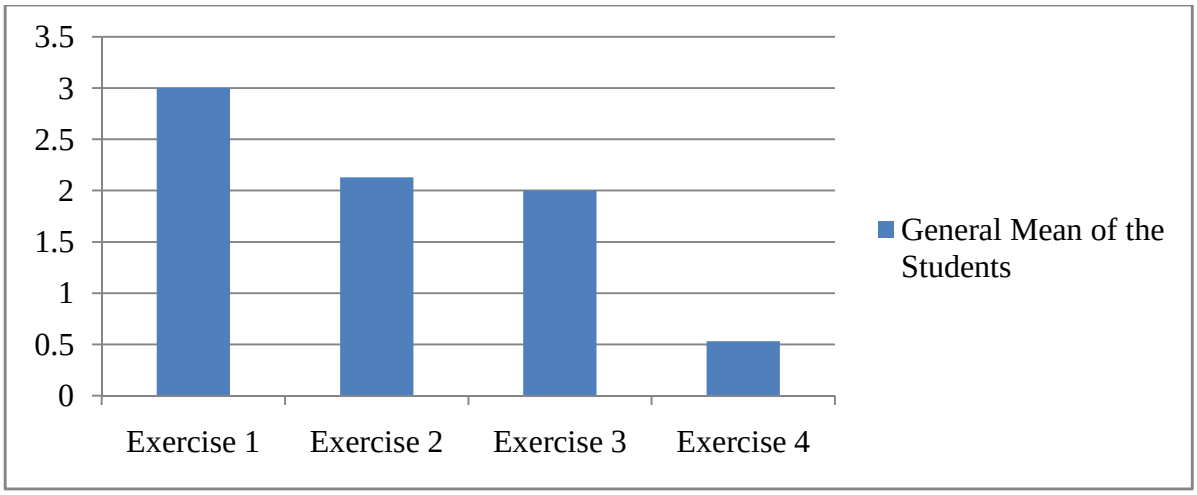

Figure 2.3. **Control Group Scores in each Pre-test Exercise**

The graphic display, which is shown in the figure above, illustrates that the performance of the control group differs from one activity to another. This is because their desired objectives and aims are not identical and students need to implement various techniques while identifying, recognising or producing words.

4.1.2. Achievements of the Control Group in the Pre-test

Following the analysis of the results of each activity in the pre-test, it is necessary to consider the total score in all exercises of each student in the control group separately. Hence,

the mean of the exercises' marks is calculated. Moreover, to show the dispersion between values in this set of exercises' scores, the S. Deviation is computed. These data are clearly shown in the table 2.4:

Student	Scores	Mean	S. Deviation
1	07/12	1.75	1.08
2	08/12	2	0.70
3	08/12	2	0.70
4	08/12	2	0.70
5	08/12	2	0.70
6	06/12	1.5	1.11
7	08/12	2	0.70
8	07/12	1.75	1.08
9	10/12	2.5	0.5
10	09/12	2.25	0.82
11	08/12	2	1.22
12	05/12	1.25	1.29
13	08/12	2	1.22
14	08/12	2	1.22
15	07/12	1.75	1.08
	7.66	1.91	0.94

Table 2.4. ***Control Group Results in the Pre-test***

We deduce from the table that the control group obtained good scores ranging from 5 to 10 knowing that the test is marked on 12 points. It is also clear that the Mean of the test activities' scores vary from (1.25 to 2.25 out of 3) with S. Deviation values of (0.5 – 1.29). In

addition, it is apparent that the majority of students (13) have got marks above the average (from 7 to 10 points). These results can be justified by the fact that they outscored in the first exercises which tend to be less challenging in terms of difficulty than the last one. This is, indeed, proved by the relatively high statistics of the S. deviation.

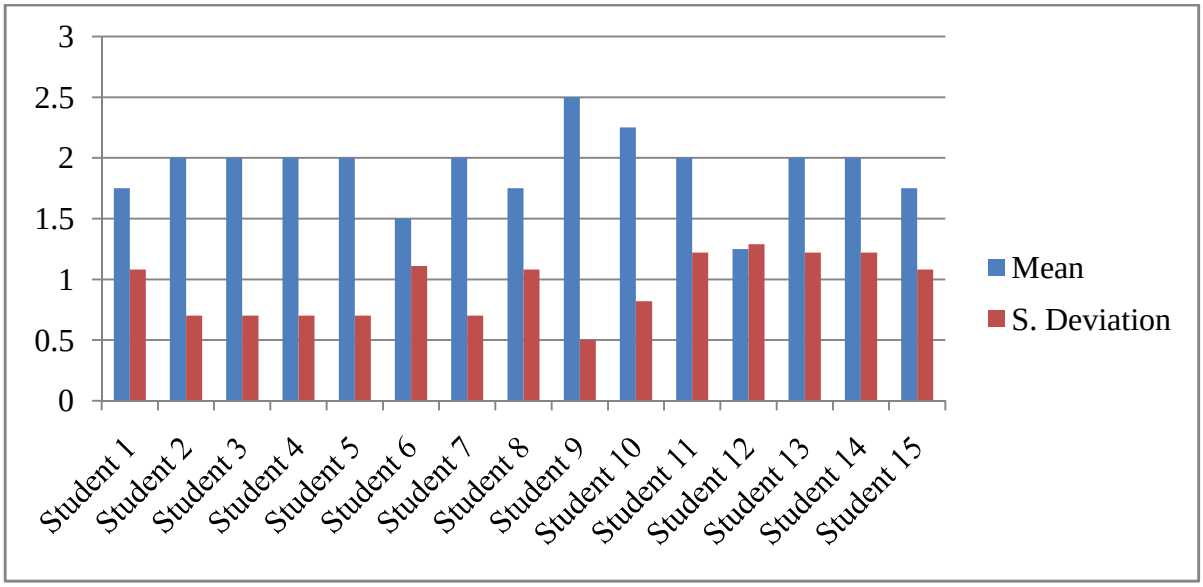

Figure 2.4. **Control Group Results in the Pre-test**

It is obvious in this graph that the scores of the control group vary from one student to another. Generally speaking, they hold good marks in the pre-test up to 2.5 out of 3 but none of them obtained the full mark. Indeed, this reflects their level of proficiency in vocabulary which seems a little above the average. Taking into account their S. Deviation statistics, their performance seems to vary from one activity to another.

4.1.3. Scores of the Experimental Group in the Pre-test Exercises

In the table 2.5, we opt for representing the experimental group's general achievements according to the activities they had taken in the pre-test.

Pre-test exercises	Scores	Frequency	Students' general mean in the exercise
Exercise 1	2 3	1 14	2.93/3
Exercise 2	1 2 3	2 12 1	1.8/3
Exercise 3	0 1 2 3	3 4 7 1	1.4/3
Exercise 4	0 1 2	7 6 2	0.66/3

Table 2.5. ***Experimental Group Scores in Pre-test Exercises***

According to the data presented in the table, nearly all of the students in the experimental group performed well in the first exercise (mean = 2.93/3). The marks taken in the second and third activities are close and they suggest that more than half of the participants scored (1 and 2 points out of 3) and just three got the full mark. In the last activity, in contrast, few students gained 2 points while the majority did not even respond to the question correctly. Hence, we figure out that the experimental group had difficulty while answering the pre-test questions regarding word recognition and word production.

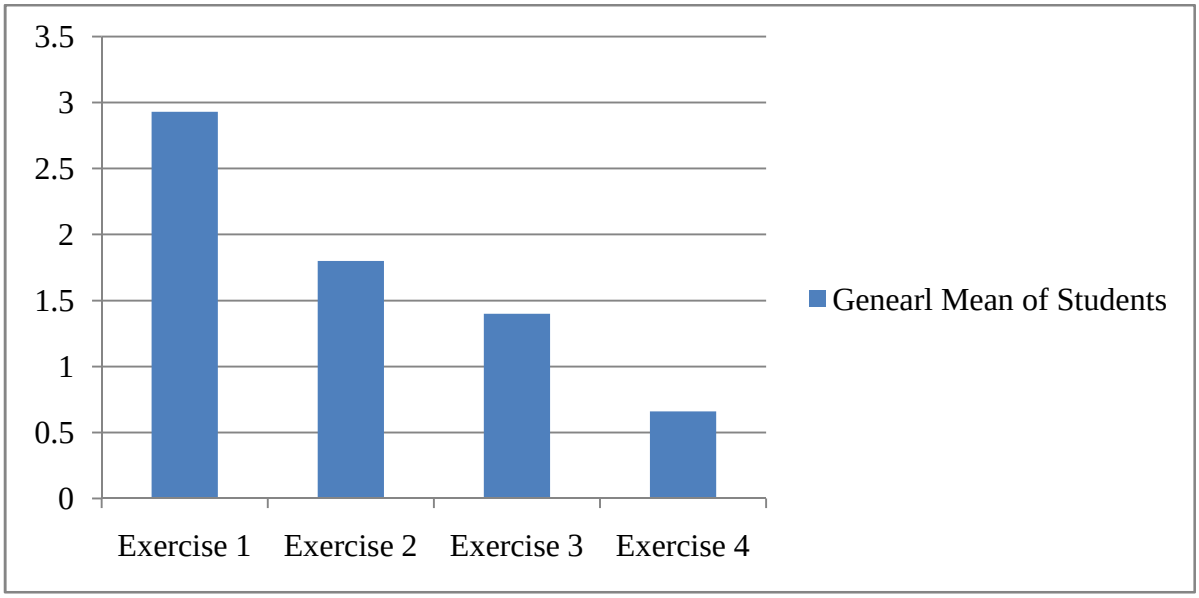

***Figure 2.5*. Experimental Group Scores in each Pre-test Exercise**

The figure demonstrates that the experimental sample outscored in the first activity which tests their background knowledge in relation to their specific field of research (Vegetal Biotechnology). These results can be explained by the fact that most of the technical items they encountered in this exercise are similar to their equivalents in French Language. In addition, it is clear that students achieved less in the second and third activities which evaluate comprehension, contextual guessing and word formation techniques. It is also worth noting that students' results in the last exercise were low evidencing that they have serious deficiency in word production techniques.

4.1.4. Achievements of the Experimental Group in the Pre-test

Concerning the answers of each student in the experimental group and total score in the pre-test as a whole, they are as follow:

Student	Scores	Mean	S. Deviation
1	07/12	1.75	0.43
2	09/12	2.25	0.43
3	05/12	1.25	1.29
4	05/12	1.25	1.29
5	06/12	1.5	0.86
6	09/12	2.25	0.82
7	09/12	2.25	0.43
8	08/12	2	0.70
9	07/12	1.75	1.80
10	07/12	1.75	0.82
11	06/12	1.5	1.11
12	05/12	1.25	1.29
13	06/12	1.5	1.11
14	08/12	2	1.22
15	07/12	1.75	0.82
	6.93	1.73	0.96

Table 2.6. ***Experimental Group Scores in the Pre-test***

As shown in the table above, the higher scores are only (9 and 8 points out of 12) and they are obtained by one third of the experimental sample with a mean of about (2 – 2.25). It is also prominent that the rest of the participants (10) got low scores varying from (5 to 7 points) with different values of mean (1.25 – 1.75) and standard deviation which reached up to 1.29. Such enduring results (general mean = 1.73/3) express their inadequate background knowledge of technical vocabulary specific to their field of study. It is noticed that the values

of the S. Deviation is high (0.43 – 1.80) indicating the underlying difference in strategies used by each student in encountering vocabulary items. The main reasons behind this can be attributed to the actual techniques of these students and their teachers of English in learning and teaching vocabulary which are evidenced to be ineffective.

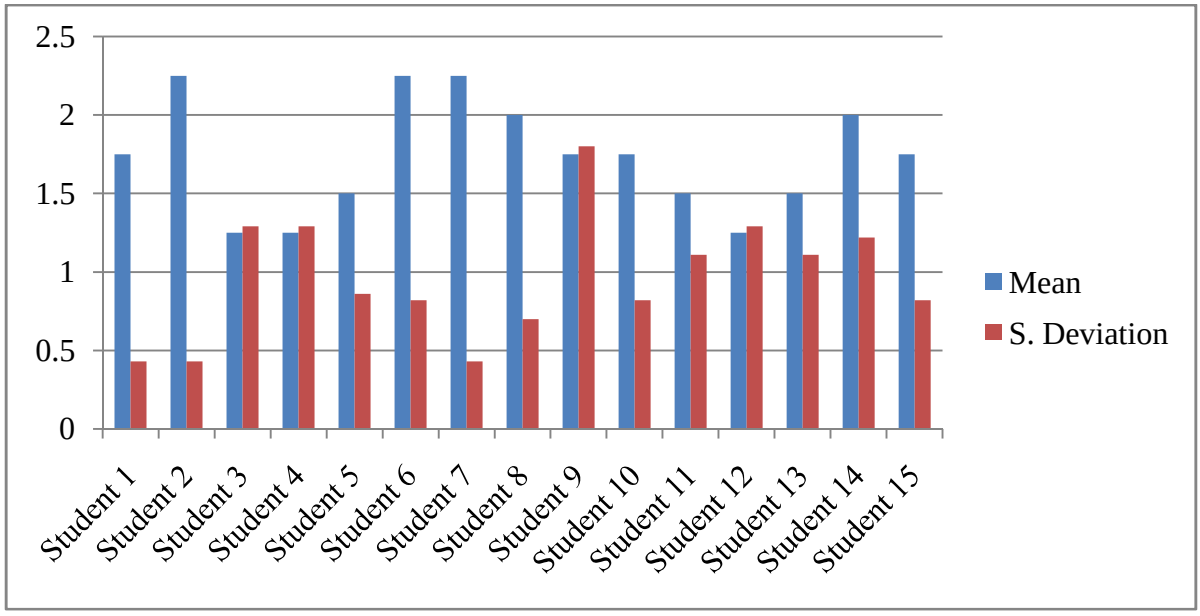

Figure 2.6. **Experimental Group Results in the Pre-test**

This diagram clarifies the analysis of the findings in the previous table 2.6. As mentioned earlier, it demonstrates the difference in the scores obtained by each of the participants in the experimental group separately. This indicates that they implement various techniques when dealing with specialised vocabulary. It also reveals their intermediate level in vocabulary as well as their basic knowledge in their main field of study.

All in all, the control group achieved relatively better than the experimental group in the diagnostic test; yet, they both recorded average results. Accordingly, the use of the genre-based approach in teaching vocabulary for ESP students did not work well to built-up a solid grasp of the English specific to their field of study. Obviously, it could not improve their overall level in scientific vocabulary.

4.2. Quantitative Results of the Post-test

After conducting the control and experimental treatments with the participants, they are set to a post-test to determine which of these treatments proves to be more effective in teaching vocabulary to students of Biology. Thus, this section focuses on the analysis of the data collected from this test.

4.2.1. Scores of the Control Group in the Post-test Exercises

This table constitutes details about how well the control group achieved in each exercise of the post-test.

Post-test exercises	Scores	Frequency	Students' general mean in the exercise
Exercise 1	1 2 3	2 11 2	2/3
Exercise 2	1 3	3 12	2.6/3
Exercise 3	1 2 3	3 11 1	1.86/3
Exercise 4	0 1 2 3	6 5 3 1	0.99/3

Table 2.7. ***Control Group Scores in the Post-test Exercises***

Based on the table 2.7., the control group results are different from one activity to another for the reason that each one is targeted to assess certain skills and competences. In the first exercise, in which the students are supposed to classify technical vocabulary items in the table according to their categories, most of them obtain the mark (2/3) whereas only two have got the best mark (3/3). Students' general mean in this activity (2) seems to be inadequately beneath the desired level. This can be reasonably explained by the fact that the students had to deal with each of the vocabulary terms separately and not into a list like in the case with the pre-test. The objective of the second one was to measure the skill of guessing the words' meaning from context. Although the students are provided with an extra misleading item, almost all of them (12 students) answered right with a general mean of (2.6 / 3). Results of the third activity, however, are too close to those gained in the first one (mean = 1.86). The last exercise has shown to be extremely challenging since they had to interpret the picture and complete the missing legends. Approximately, half of the participants found difficulty in answering this question and only four of them achieved the average. It becomes clear, then, that the control group attained different scores proving that they have different levels, and do not use the same strategies to deal with the materials they are exposed to.

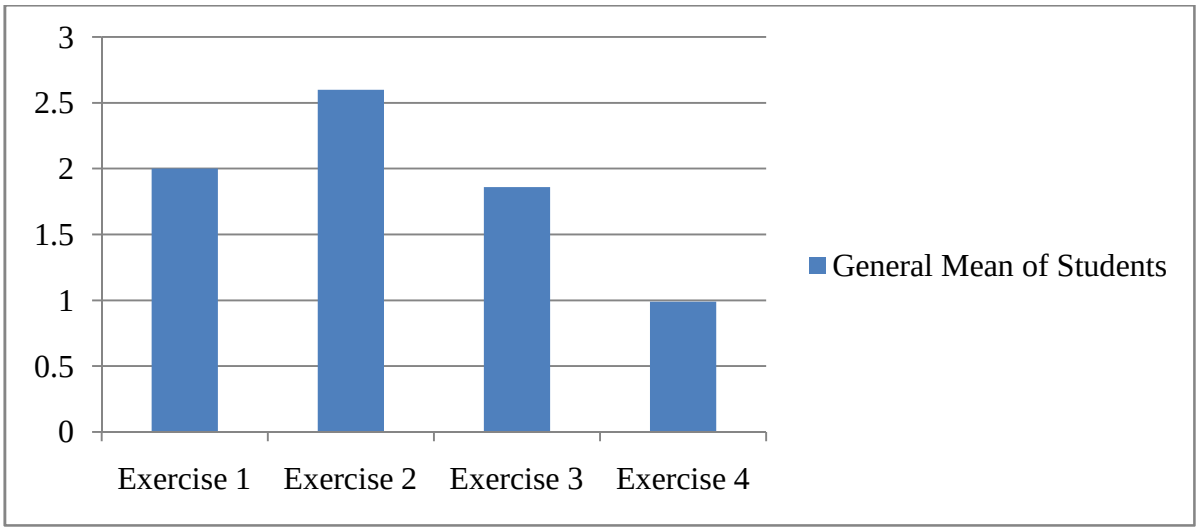

Figure 2.7. **Control Group Scores in each Post-test Exercise**

The figure 2.7 depicts the underlying difference in the performance of the control group in terms of the second test activities. This test is held after students are exposed to a traditional treatment for four weeks using the genre-based approach.

4.2.2. Achievements of the Control Group in the Post-test

Results of the control group after taking the post-test are summarised in table below:

Student	Scores	Mean	S. Deviation
1	07/12	1.75	1.08
2	07/12	1.75	0.82
3	06/12	1.5	1.11
4	07/12	1.75	1.08
5	07/12	1.75	1.08
6	08/12	2	0.70
7	09/12	2.25	0.82
8	08/12	2	0.70
9	08/12	2	0.70
10	08/12	2	0.70
11	06/12	1.5	1.11
12	05/12	1.25	0.43
13	10/12	2.5	0.5
14	09/12	2.25	0.43
15	06/12	1.5	1.11
	7.4/12	1.85	0.82

Table 2.8. ***Control Group Results in the Post-test***

Concerning this test, which was held at the end of the experiment, the scores obtained are satisfactory in general raging from (05 – 09 points out of 12) with means of (1.5 – 2.25). This is for the fact that the majority of students (11 students) in the control group achieved more than the average as compared to the remaining four students who could not even reach the average. Values of the S. deviations (0.43 to 1.11) show that the marks of each single student in the post-test activities are not widely varied.

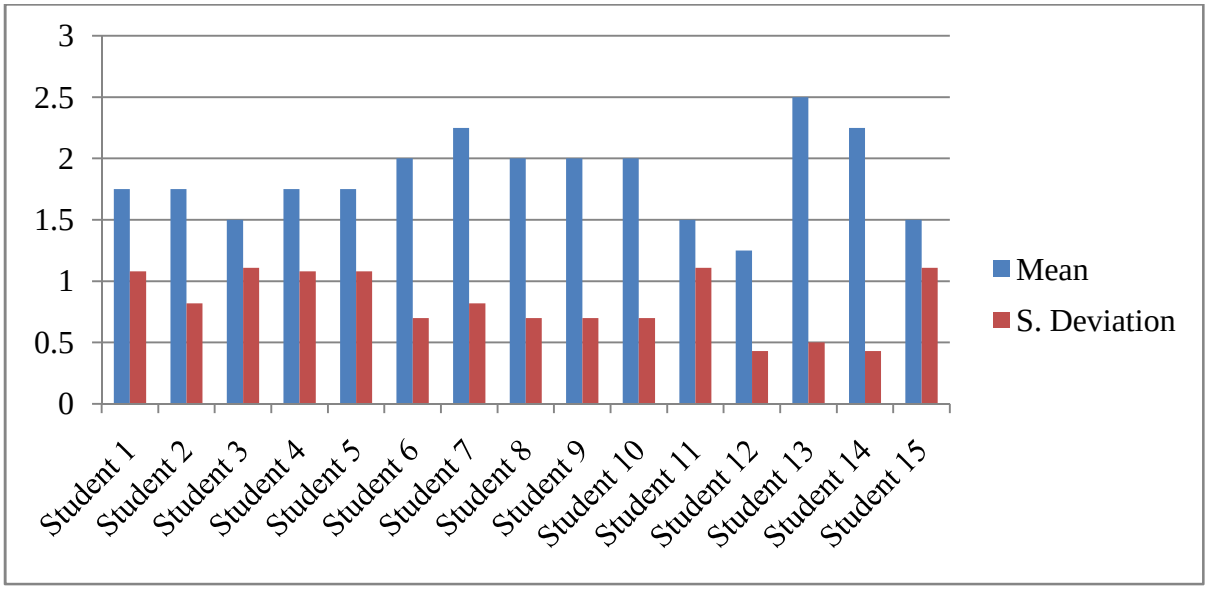

Figure 2.8. **Control Group Results in the Post-test**

In this diagram, it is obvious that participants in the control group tend to be of different levels and learning strategies. It is essential also to point out that the majority of them had successfully reached the average mean. Still, their scores were not very high as most of them achieved only between (1.5/3) and (2/3), and only three students had a mean above (2/3) while no one could have the full mark. Consequently, we can conclude that although the control group achieved the average in general, their results are not remarkably good.

4.2.3. Scores of the Experimental Group in the Post-test Exercises

Having received the experimental treatment following the deep-end methodology, the experimental group is set for a post-test. Their achievements in each activity are shown in the table below:

Post-test exercises	Scores	Frequency	Students' general mean in the exercise
Exercise 1	2 3	1 14	2.99/3
Exercise 2	3	15	3/3
Exercise 3	1 2 3	2 4 9	2.46/3
Exercise 4	0 2 3	1 10 4	2.13/3

Table 2.9. ***Experimental Group Scores in the Post-test Exercises***

This post-test is carried out to check any improvement regarding the level of the experimental group participants in scientific vocabulary. The data exhibited in the table propose that the overall scores of activities are very good (means = 2.13 to 2.99 out of 3). Almost all of them performed well in the first three exercises and get high scores of (2 and 3). It is worth noting that the general mean of the first activity is lower since it subsumes the technical items being dealt with during the phase of treatment. We can notice that the scores

in the second exercise are the highest because the contextualised items are associated with the topics of ‘genetic engineering’ and ‘the structure of the DNA’, which were thoroughly taught earlier in the treatment phase. Results to the third task are remarkably good because participants had already prepared presentations about the same issue of ‘hybridisation’ and discussed exhaustively its meaning, methods, advantages, drawbacks and limitations. As for the last one, it seems clear that only one student have difficulty with the related items as they are associated with the topic of ‘photosynthesis’ which was tremendously tackled in a whole lecture in this experiment.

It is worth mentioning that in these activities, the students are judged in terms of skills of remembering, comprehension, analysis and application. In addition, they are intended to evaluate the techniques of categorisation, word identification, guessing the words’ meaning, word derivation as well as interpreting illustrations and producing new words. This indeed, proves that the experimental lectures and method of instruction implementing the deep-end methodology is of great influence on participants’ vocabulary.

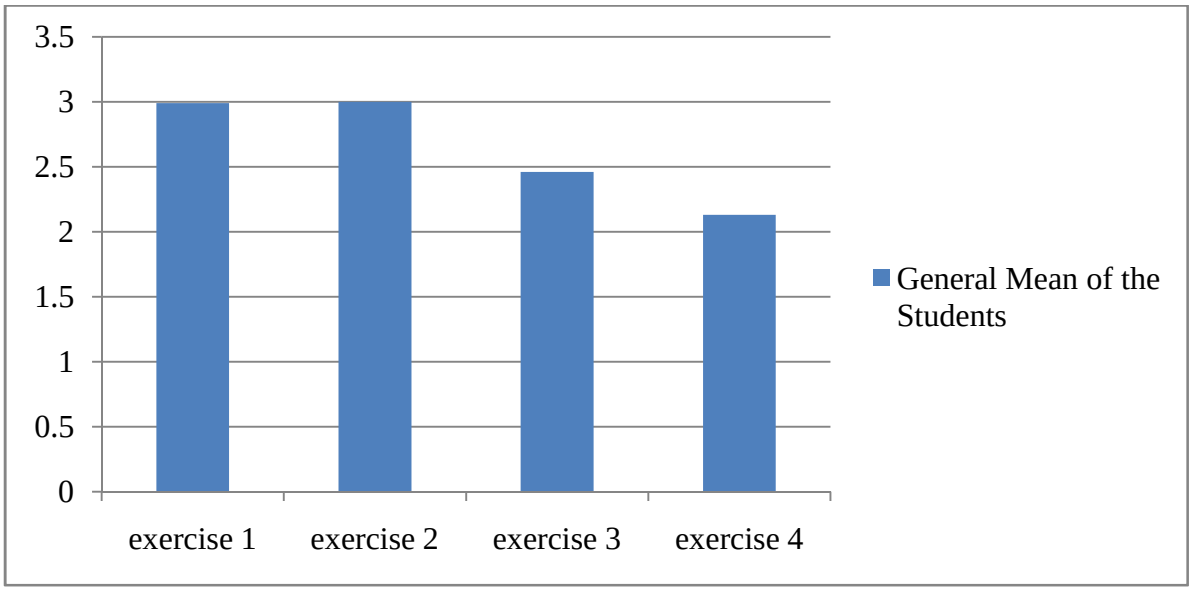

***Figure 2.9*. Experimental Group Scores in each Post-test Exercise**

As shown in figure 2.9, students' results in the post-test are outstandingly high in all activities and this reflects the development in vocabulary learning strategies and techniques.

4.2.4. Achievements of the Experimental Group in the Post-test

Results of the experimental group in the post-test in terms of students' achievements are demonstrated in the following table:

Student	Scores	Mean	S. Deviation
1	10/12	2.5	0.5
2	10/12	2.5	0.5
3	10/12	2.5	0.5
4	09/12	2.25	1.29
5	12/12	3	0
6	12/12	3	0
7	12/12	3	0
8	12/12	3	0
9	10/12	2.5	0.5
10	11/12	2.75	0.43
11	09/12	2.25	0.82
12	11/12	2.75	0.43
13	09/12	2.25	0.82
14	11/12	2.75	0.43
15	10/12	2.5	0.5
	10.53/12	2.63	0.44

Table 2.10. ***Experimental Group Results in the Post-test***

Obviously, data shown in the table 2.10 indicate that the full mark 12/12 is obtained by almost one third of the participants (4 students). The rest of the experimental sample recorded high scores (9 - 11 out of 12) and means (2.25 – 2.75 out of 3). Furthermore, the S. Deviation values are low as students had marks which are close to each other in each exercise.

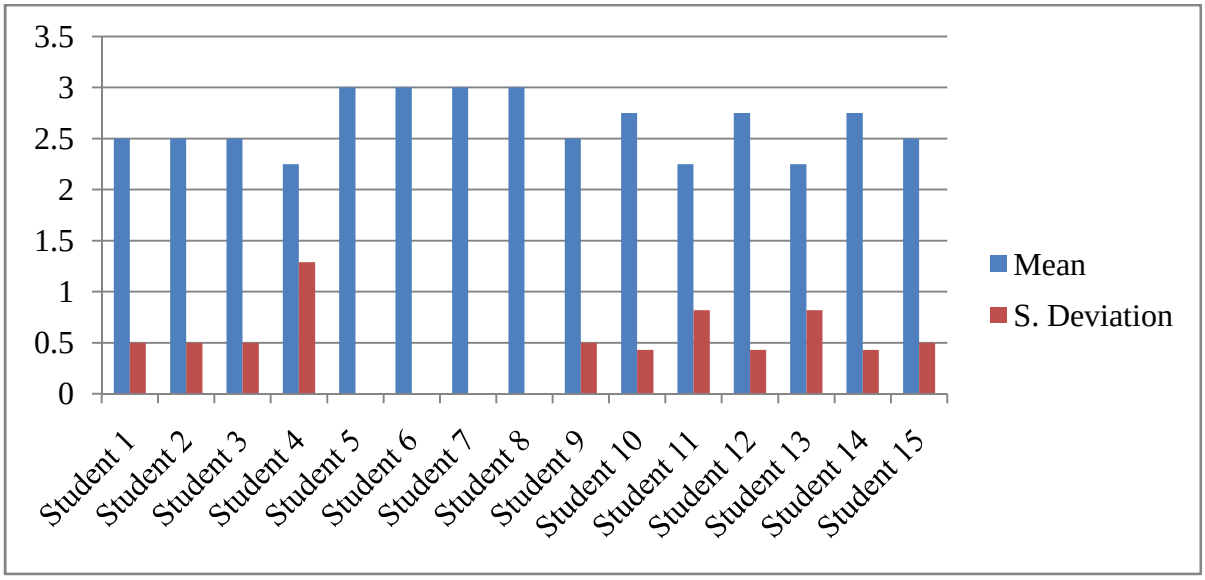

Figure 2.10. **Experimental Group Scores in the Post-test**

In this graph, data show the high means of participants and their low S. Deviation statistics. This clearly proves the change in ESP students' level which is related to the instruction methodology adopted in this experiment (the deep-end methodology).

4.3. Comparison of Pre-test and Post-test Achievements

In this section, the findings prevailed in both tests of the experimental and the control groups are to be compared. This is basically done to examine any improvement in students' achievements after being exposed to similar assignments but different methodologies during the stage of treatment. That is to say, our hypothesis will be confirmed or disconfirmed regarding the impact of the independent variable (using the deep-end methodology) on the dependent variable (vocabulary).

4.3.1. Comparison of Pre-test and Post-test Achievements of the Control Group

Differences between achievements of the control group in both tests are clearly pointed in the table 2.11:

	Pre-test			**Post-test**		
Student	**Scores**	**Mean**	**S. Deviation**	**Scores**	**Mean**	**S. Deviation**
1	07	1.75	1.08	07	1.75	1.08
2	08	2	0.70	07	1.75	0.82
3	08	2	0.70	06	1.5	1.11
4	08	2	0.70	07	1.75	1.08
5	08	2	0.70	07	1.75	1.08
6	06	1.5	1.11	08	2	0.70
7	08	2	0.70	09	2.25	0.82
8	07	1.75	1.08	08	2	0.70
9	10	2.5	0.5	08	2	0.70
10	09	2.25	0.82	08	2	0.70
11	08	2	1.22	06	1.5	1.11
12	05	1.25	1.29	05	1.25	0.43
13	08	2	1.22	10	2.5	0.5
14	08	2	1.22	09	2.25	0.43
15	07	1.75	1.08	06	1.5	1.11
	7.66/12	1.91	0.94	7.4/12	1.85	0.82

Table 2.11. ***Comparison of the Control Group Results in the Pre-test/ Post-test***

The table 2.11 demonstrates the difference in performance of the control group in both tests to detect any improvement within the use of traditional methods in teaching vocabulary. Results show that students in the second test, recorded scores that are slightly different; either a bit higher or lower than the first test. In this respect, it seems that the genre-based approach to teaching scientific vocabulary proves to be inefficient for students of Biology.

The table below summarises the difference between the control group results of the pre-test and those of the post-test. This is actually to detect any improvement in their level that would be attributed to the use of the 'genre-based' approach in their control treatment.

N° of Students	**The test**	**Mean**	**S. Deviation**
15	Pre-test	1.91	0.94
	Post-test	1.85	0.82
	Difference	- 0.06	0.12

Table 2.12. ***The Overall Pre-test/Post-test Difference of the Control Group***

As indicated by the findings of this group, students' mean of the post-test dropped of 0.6 as compared to the pre-test. This can be attributed to the fact that the former was intentionally designed to be a bit more challenging than the last one to ensure maximum reliability and achieve credibility for the results obtained. Therefore, there is no doubt that the method used in the control treatment could not help the students develop their vocabulary.

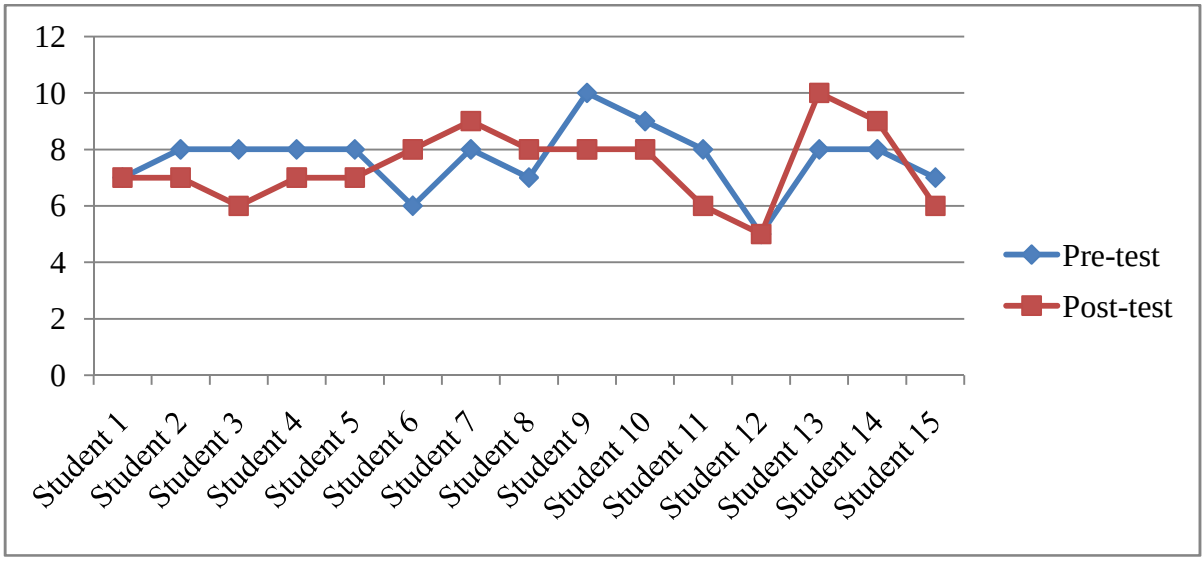

Figure 2.11. **Comparison of the Control Group Scores in the Pre-test and Post-test**

The data exhibited in figure 2.11 shows the difference in results before the up taking of the control treatment and after. The line of the post-test overlaps with that of the pre-test designating that scores obtained are somewhat more or less. It becomes clear then, that there is no improvement in the level of students' strategies and techniques used to approach vocabulary under the genre-based methodology.

4.3.2. Comparison of Pre-test/Post-test Achievements of the Experimental Group

The table 2.13. provides details about the performance of the experimental group before and after the treatment, where they were taught according to the deep-end method.

	Pre-test			Post-test		
Student	**Scores**	**Mean**	**S. Deviation**	**Scores**	**Mean**	**S. Deviation**
1	07	1.75	0.43	10	2.5	0.5
2	09	2.25	0.43	10	2.5	0.5
3	05	1.25	1.29	10	2.5	0.5
4	05	1.25	1.29	09	2.25	1.29
5	06	1.5	0.86	12	3	0
6	09	2.25	0.82	12	3	0
7	09	2.25	0.43	12	3	0
8	08	2	0.70	12	3	0
9	07	1.75	1.80	10	2.5	0.5
10	07	1.75	0.82	11	2.75	0.43
11	06	1.5	1.11	09	2.25	0.82
12	05	1.25	1.29	11	2.75	0.43
13	06	1.5	1.11	09	2.25	0.82
14	08	2	1.22	11	2.75	0.43
15	07	1.75	0.82	10	2.5	0.5
	6.93/12	1.73	0.96	10.53/12	2.63	0.44

Table 2.13. ***Comparison of the Experimental Group performance in the Pre-test / Post-test***

These results illustrate a huge leap which is recorded between the post-test and the pre-test achievements of the whole experimental group. This confirms the noticeable advance in vocabulary level.

The table 2.14 indicates the difference in the pre/ post-test results of the experimental group:

N° of Students	The test	Mean	S. Deviation
15	Pre-test	1.73	0.96
	Post-test	2.63	0.44
	Difference	0.9	0.52

Table 2.14. ***The Overall Pre-Test/Post-Test Difference of the Experimental Group***

If we refer to the table above, we remark that achievements of the experimental group before and after the treatment of the deep-end approach are totally varied with a difference of (0.9/3). Actually, a significant improvement is marked revealing that participants have really grasped well the designed courses which aimed at enriching technical vocabulary. This asserts that the assignments content and methodology presented in the experimental courses lead to amazing results since the large majority of the participants developed skills of word recognition and even word formation. Strategies to catch and grasp contextualised technical vocabulary are improved as well.

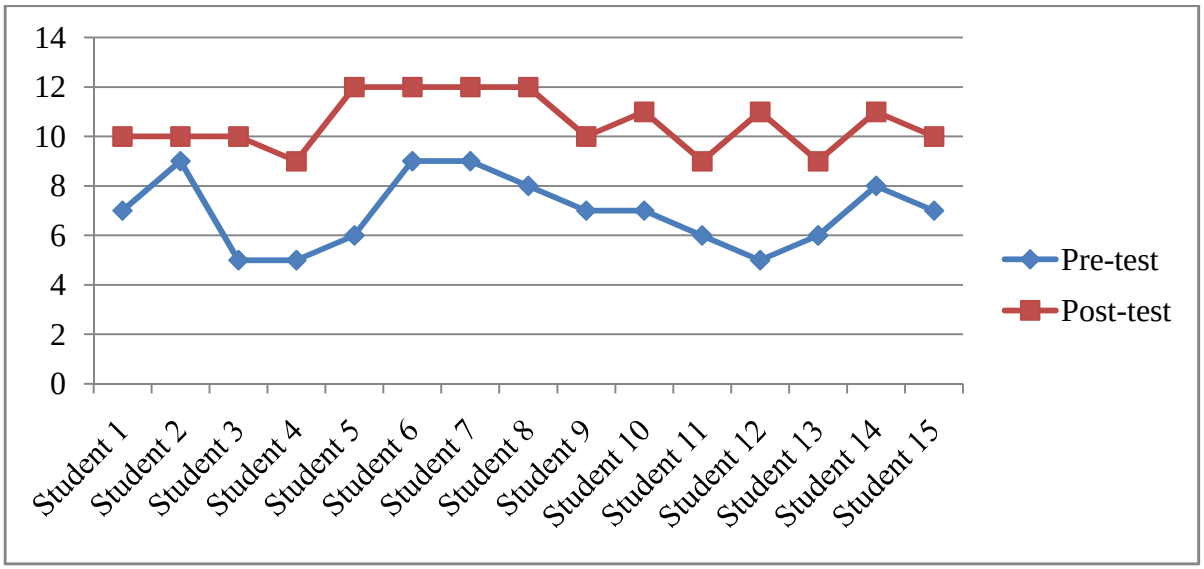

Figure 2.12. **Comparison of the Experimental Group Scores in the Pre-test and Post-test**

In chart 2.12, the line representing the post-test scores is high above the line of pre-test results, which means that the performance of the experimental group in the post test is much better than that of the pre-test. Hence, we deduce that this group recorded a valid and significant improvement in accurate scientific vocabulary.

5. Hypothesis Testing

After descriptive statistics are analyzed, these results are to be verified in a very valid statistical test (T-test) to prove the hypothesis of the current research. In this test, we need to compare two means in accordance to variation in our research (the standard deviation or the deviation of scores from the mean). In fact, the appropriate t-test that fits this study research is the independent (unpaired) test since we are dealing with two different groups (control/experimental). That is we need to examine the probability P that the observed results could have occurred under the null hypothesis. If this probability is less than, or equal to 0.05, the null hypothesis is thus to be rejected in favour of our alternative hypothesis. We can come up, then, with the conclusion that the results are significant. The P value (0.05) stands for 5 % of the findings happening by chance while 95% are considered to be true and valid. This means that the smaller P value we have, the more we reject the null hypothesis and, hence, the more we prove our alternative hypothesis in the current study.

Therefore, to confirm the assumption that the incorporation of the deep-end methodology in the treatment of the experimental group improves their scientific vocabulary, we need to follow some steps to calculate the unpaired t-test. Thus, the following equations are applied on our results. It is worth noting that:

- H1 stands for the hypothesis formulated in this research assuming that the integration of the deep-end methodology would help improve learners' scientific vocabulary.

- **H0** stands for the hypothesis assuming that the integration of the deep-end methodology would not help improve learners' scientific vocabulary.

- **Degree of freedom** (the description of scores that are free to vary) = $\mathbf{N_1 + N_2 - 2} = 30 - 2 = 28$

- **P value** = 0.05

- To calculate the means of both groups ($\overline{X}1$, $\overline{X}2$), the following formula is used: $\overline{\mathbf{X}} = \frac{\sum \mathbf{N}}{\mathbf{N}}$

- Variation of both samples ($S^2{}_1$ and $S^2{}_2$) is found by computing: $\mathbf{S^2} = \frac{\sum \mathbf{X^2}}{\mathbf{N}} - \overline{\mathbf{X^2}}$

- The critical value of the T for the desired level of significance is calculated by:

$$\mathbf{t_{N_1 + N_2 - 2}} = \frac{(\overline{\mathbf{X}}_1 - \overline{\mathbf{X}}_2)\sqrt{(\mathbf{N_1 + N_2 - 2})\,\mathbf{N_1 N_2}}}{\sqrt{(\mathbf{N_1 S_1^2 + N_2 S_2^2})(\mathbf{N_1 + N_2})}}$$

So as to calculate the t-test, we need to organise the results of the post-test in both groups. The table 2.15. presents the mean values obtained by participants of the control and experimental groups in the post-test.

	Experimental Group		Control Group	
Student	**Post-test mean**	**Post-test mean squared**	**Post-test mean**	**Post-test mean squared**
1	2.5	6.25	1.75	3.06
2	2.5	6.25	1.75	3.06
3	2.5	6.25	1.5	2.25
4	2.25	5.06	1.75	3.06
5	3	9	1.75	3.06
6	3	9	2	4
7	3	9	2.25	5.06
8	3	9	2	4
9	2.5	6.25	2	4
10	2.75	7.56	2	4
11	2.25	5.06	1.5	2.25
12	2.75	7.56	1.25	1.56
13	2.25	5.06	2.5	6.25
14	2.75	7.56	2.25	5.06
15	2.5	6.25	1.5	2.25
	$\Sigma X_1 = 39.5$	**$\Sigma X_1^2 = 105.11$**	**$\Sigma X_2 = 27.75$**	**$\Sigma X_2^2 = 52.92$**

Table 2.15. ***Control and Experimental Groups' Differences in Scores***

$$\overline{X}_1 = \frac{\sum X_1}{N_1} = \frac{39.5}{15} = 2.63$$

$$\overline{X}_2 = \frac{\sum X_2}{N_2} = \frac{27.75}{15} = 1.85$$

$$S_1^2 = \frac{\sum {X_1}^2}{N_1} - \overline{{X^2}_1} = \frac{105.11}{15} - 6.91 = 0.09$$

$$S_2^2 = \frac{\sum {X_2}^2}{N_2} - \overline{{X^2}_2} = \frac{52.92}{15} - 3.42 = 0.10$$

$$t_{N_1 + N_2 - 2} = \frac{(2.63 - 1.85)\sqrt{(15 + 15 - 2)\ 15 \times 15}}{\sqrt{(15 \times 0.09 + 15 \times 0.10)(15 + 15)}} = \frac{61.90}{9.24} = 6.69$$

t = 6.69

By calculating the P value of 0.05 one tail and the df value = 28, we find out that the critical value of degrees of freedom equals (1.67). We can notice, then, that the recorded t value (6.69) is much greater than the critical value of degrees of freedom (1.67) evidencing that the alternative hypothesis H1 is accepted while the null hypothesis H0 is rejected (Hamilton, 2007). This confirms the assumption that the treatment realised through the implementation of the deep-end methodology has a positive effect on the participants' vocabulary.

6. Discussion and Interpretation of the Findings

The current research has investigated the role of using the deep-end methodology in enhancing ESP learners' vocabulary. This hypothesis was examined by means of an experiment to check the nature of the relationship between these variables (ESP, the deep-end methodology and vocabulary). Accordingly, the sample of the study, who are divided into two groups (control and experimental), were set for a pre-test before they received a treatment. In this procedure, the control group was taught by their teacher using the genre-based approach whereas the experimental group was subject to a deep-end methodology. Next, a post-test was administered to allow for a comparison between the achievements of both groups before and

after the treatment. Results obtained from this experiment were statistically analysed using an unpaired T-test which confirmed the previously mentioned hypothesis. The findings of the current study, therefore, are to be discussed in this section.

Based on the comparison between both groups' results, we deduce that the proficiency level of the control group was better than that of the experimental group before the treatment took place. Despite the fact that control group achievements were somehow good in the pre-test, they did not show any improvement once taking the post-test. On the other hand, the performance of students in the experimental group was outstanding. Indeed, they tended to outscore in the post-test activities although they were intentionally designed to be more challenging than those of the first test. This remarkable progress is attributed to the incorporation of the deep-end methodology in the treatment addressed to this group. This proves that deep-end methodology helps ESP learners develop their vocabulary learning strategies namely, word recognition and comprehension as well as word production. They tend to benefit of this approach as it allows them to encounter vocabulary items by being engaged into communicative tasks simulating real life situations. That is to say, vocabulary acquisition is self-directive occurring naturally into meaningful and authentic contexts resembling academic and occupational situations.

7. Pedagogical Recommendation

The present study is threefold as it investigates the role of using the deep-end methodology in ESP classrooms in relation to vocabulary teaching and learning. It also sheds light on its practical implementations and contributions to the realm of education as a whole and ESP in particular. Findings drawn from this experimental research elicits a number of practical implications that need to be considered by ESP practitioners.

Certain practical proposals are suggested to reform ESP courses. These courses must aim at developing learners' overall communicative competence in their specific field as well as improving their language skills. Accordingly, the course content must be targeted to encounter communicative message and meaning of vocabulary terms instead of their forms. Vocabulary learning strategies like contextual guessing, affixation, vocabulary associations and word recycling also need to be developed. That is to say, the course materials need to be tailored so as to achieve the previously mentioned skills. ESP instruction needs to supply authentic and meaningful materials taken from a variety of reliable and valid sources. This requires using certain equipments and technologies like multimedia laboratories, computers, courseware, and the Internet to obtain desired results. Moreover, by providing communicative tasks, learners are allowed to discuss about their preferred topics which may foster the course effectiveness in contrast to limited discussions.

Taking into account the complexity of vocabulary teaching and learning in ESP contexts, the teaching methodology ought to be relevant to learners' needs in their field of study. This requires the implementation of the deep-end methodology to enable the learners to communicate effectively in academic or professional situations. The course instruction, thus, must focus on vocabulary usage rather than its structural features. In this respect, technical vocabulary had better be taught implicitly into context to assist learners to enhance their learning skills.

ESP courses do not only demand a tremendous preparation to ensure adequate vocabulary acquisition, but also includes critical examination of their components. This is possible through needs and situation analyses to determine to what extent they are effective to be able to provide timely feedback. This seems to be of great importance since students'

perception of the course relevance to their needs and interests is connected to how well they learn.

Teaching technical vocabulary is crucial in LSP courses. This is due to its occurrence in real life situations and its frequent use in specialised contexts. Hence, it should be given priority in ESP instruction. Teachers, then, must be familiar with this specific lexicon; otherwise, they would have difficulties to offer help to ESP learners. Consequently, it is highly recommended that EFL teachers, who are assigned to teach ESP, receive a special training. By taking such pre-service and in-service courses, these teachers will be more qualified to face contexts relevant to specific subjects. Practitioners are also required to have full mastery of techniques on how to incorporate emerging technologies for teaching and learning purposes.

To sum up, in reference to Algerian case, ESP instruction is based on teaching specific vocabulary and translating texts. As a matter of fact, this has been subject of criticism since these courses neglect learners' academic and professional needs resulting in low motivation. Thus, course developers must reconsider course content, and teaching methods to reflect personal and professional world. Hence, teachers of ESP at university are urged to adopt the deep-end methodology to meet the learners' needs. For this method to be applicable in ESP contexts, teachers, course designers as well as institutions are invited to pursue the following recommendations. First of all, programs need to be organised so as to prepare the learners to survive the globalised world. That is to say, the input of these courses should aim at developing learners' communicative skills. To this end, vocabulary terms had better be introduced and dealt with implicitly into a context. This also necessitates the involvement of cooperative learning techniques to foster interaction in the ESP classroom. In addition, they ought to raise learners' awareness, self-autonomy, self-confidence, and motivation. Moreover,

teachers' training is significant since it helps to make the compromise between the underlying EFL research and ESP usage.

8. Limitations of the Study

Once conducting this experiment about the effectiveness of the deep-end methodology in ESP vocabulary instruction, many issues were raised. It was clear that time spent on the treatment of the experimental study was not long enough to familiarise learners with the basic techniques underlying this methodology. Only four sessions were not sufficient to cover all vocabulary learning /teaching strategies and consolidate their understanding. The problem is that learners are not acquainted with the communicative requirements of universities nowadays. This is because they lack the skills of directing their own learning since they used to rely on teachers making decisions for them. Hence, they need more time to be familiar with this shift in roles and encounter vocabulary within a learner-centred environment.

Besides, this study has been carried out in the department of Biology, faculty of Science and Technology at the University Centre of Boussouf Abelhafid, Mila. So, results are limited to Master students of Biology and may not represent all ESP students of various levels and specialties in all Algerian universities. Yet, findings obtained can be generalised and applicable to similar contexts. Furthermore, this study accounts for only two teaching options of ESP: the genre-based and deep-end methodologies.

Conclusion

In this chapter, information about sample groups of the study are introduced and the methodology to data collection is explained. After the procedures of the experiment are discussed, results of both experimental and control groups are compared. The objective, thereby, is to investigate any improvement on the level of vocabulary after the treatment that

lasted four weeks. That is say, it aims at checking the impact of integrating the deep-end methodology in ESP instruction in respect to learners' vocabulary. These findings indicate that there are significant differences in favour of the experimental group. By calculating the t value (6.69) as compared to the critical value (1.67), we confirm the alternative hypothesis. Hence, it is evidenced that the deep-end methodology enhances learners' vocabulary.

GENERAL CONCLUSION

The present study is held to affirm the hypothesis which reports that if taught ESP using the deep-end methodology, learners' vocabulary is likely to increase. Thus, topics regarding vocabulary, ESP, and the deep-end methodology are dealt with in theory. To study the interrelationship between these variables, an experimental research is adopted.

To conclude with, teachers of ESL strive hard to develop communicative skills among their students especially with respect to ESP. Course content and methods must be, therefore, consistent with this objective. So, language forms, including vocabulary, must be presented in context for it leads to meaningful and natural communication.

Indeed, classroom methodologies, which make such an extensive use of simulations, are termed as deep-end methodology because learners are cast into a situation where they need to communicate using whatever language they have at their disposal without preparation. In a way then, ESP learners are encouraged to develop risk-taking skills and build their self-confidence to be able to communicate effectively in similar situations in real life academic or professional contexts. This tends also to ensure self-directive learning and learners' autonomy in the ESP classroom. This holds that language aspects and particularly vocabulary are acquired by ESP students in a meaningful way due to the natural flow of instruction as a result of the deep-end methodology.

The findings of the study led to the firm conclusion that within the limitation of the design and implementation procedures of the research, incorporating the deep-end methodology in teaching ESP enhances learners' vocabulary stock. It is also evidenced that its practical techniques serve to foster the vocabulary acquisition strategies among ESP learners.

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APPENDIX I

STUDENTS' PRE-TEST

Dear students,

You are kindly requested to take few minutes to complete this test. The latter aims at investigating the effectiveness of using the deep-end methodology in teaching English for specific purposes on developing learners' vocabulary.

We will be grateful to you if you read the text carefully and then answer the questions.

Thank you in advance for your precious cooperation.

Exercise one: Match categories with their associated technical vocabulary terms.

Categories	Technical terms
1- biochemistry	recombinants DNA – genetically modified organism – chromosome – gene therapy – phenotype – genetic disorders
2- botany	chemicals – biomolecule - inorganic /organic reactions – fertilizers – crop cultivation – pest control
3- genetic engineering	phycology – bryophytes – fern – plant taxonomy – seed – fungi – plant breeding

Exercise two: Circle the letter that corresponds to the right answer.

Throughout history the development of new technologies has enabled dramatic improvements in our quality of life tackling the problems facing humanity. Modern biotechnology, or the application of our knowledge of the genome to engineer organisms with

beneficial traits, enables new solutions to today's challenges as hunger, disease, the need for raw materials, and pollution. Industrial farming and food production have prompted dramatic shifts in the world economy by making crops more productive and tolerant of environmental stress and also nutrition-enhanced. Some of the first applications of new biotechnology are the genetic engineering in the pharmaceutical industry synthesizing insulin and other treatments including interferon therapy to trigger the immune system, human growth hormone, antibiotic-resistant bacteria and the hepatitis B vaccine. Besides, it is developing enzymes capable of degrading chemical residue of petroleum production in the oil sands industry, and techniques to recycle the PET plastic used in packaging in addition to creating polluted water filters utilizing proteins. Other modern tools were offered to make it easy to reach and process metal deposits. These challenges facing humanity remain significant and society simply cannot let these potential solutions be ignored.

1- Modern biotechnology is the branch of biology that deals with ……

a- microorganisms' structures, functions, uses and modes of existence

b- the relation and interaction between organisms and their environment.

c- the technological application of organisms and biological systems to make or modify products.

2- The 'interferon' is a protein produced by cells as a result of ……

a- viral reaction

b- bacterial reaction

c- allergic reaction

3- Some …… are developed to degrade chemical residues of petroleum production

a- proteins

b- hormones

c- pheromones

Exercise three: Complete the table below and then fill in the gaps with these words.

Noun	Adjective
……..	toxic
chemistry	……..
resistance	……..

Herbicide tolerance enables the use of fewer types of herbicides and reduces the number of applications needed. Fewer or higher doses of the ……..…..… herbicide are possible without damaging the crop. The end result is that close to the same amount of the resisted herbicide is used but many other herbicides are eliminated –an overall reduction. Most current complaints about pesticides and genetic engineering concern the introduction of genes allowing the plants to produce biological insecticides such as Bacillus-thuringiensis ……..…..… This, of course, directly reduces the need for applied synthetic ……..… pesticides. For example, BT crops have saved about 1,000,000 liters of insecticide applications in the US during the past 4 years.

Exercise four: Fill in the gaps using appropriate words.

Genetic Engineered food is different from food produced with traditional techniques. Humans have been selectively breeding plants for tens of thousands of years to get certain

desired traits. For example, farmers have bred corn to become larger, to hold more kernels on an ear, and to flourish in different climates. Genetic engineering, in contrast, involves the direct manipulation of DNA. It often takes two forms; ‘cisgenesis’ involving direct swapping of ……. between two organisms that could breed (say, from wheat to wheat) or ‘transgenesis’ which involves taking well-characterized genes from different ……. (say, bacteria) and transplanting them into a crop (such as corn). This technology tries to create plants with desired ……. like traditional breeding but allows even more fine-tuning allowing for faster transfer of specific genes and thus a much greater array of characteristics.

Thank you for your kind collaboration

APPENDIX II

STUDENTS' POST-TEST

Dear students,

You are kindly requested to take few minutes to complete this test. The latter aims at investigating the effectiveness of using the deep-end methodology in teaching English for specific purposes on developing learners' vocabulary.

We will be grateful to you if you read the text carefully and then answer the questions.

Thank you in advance for your precious cooperation.

Exercise one: Classify the following technical vocabulary terms in the table.

cytokinins – insect – water – auxins – microorganism – acetone – gibberellins – hexane – plant – ethanol – virus – brassinosteroids – dichloromethane – fungi – ethylene

Categories	**Technical terms**
Organisms	
Solvents	
Hormones	

Exercise two: Read the passage below and then match words with their corresponding definitions.

In plants DNA is contained within the membrane-bound cell structures of the nucleus, mitochondria, and chloroplast. A DNA molecule consists of two strands of

nucleotides twisted together to form a double helix. Each nucleotide has a five-carbon sugar (deoxyribose), phosphate, and nitrogenous base: the double-ringed purines of adenine (A) and guanine (G) and the single-ringed pyrimidines of thymine (T) and cytosine (C). Most of the properties of DNA relate to the unique bonds that form among the nucleotides.

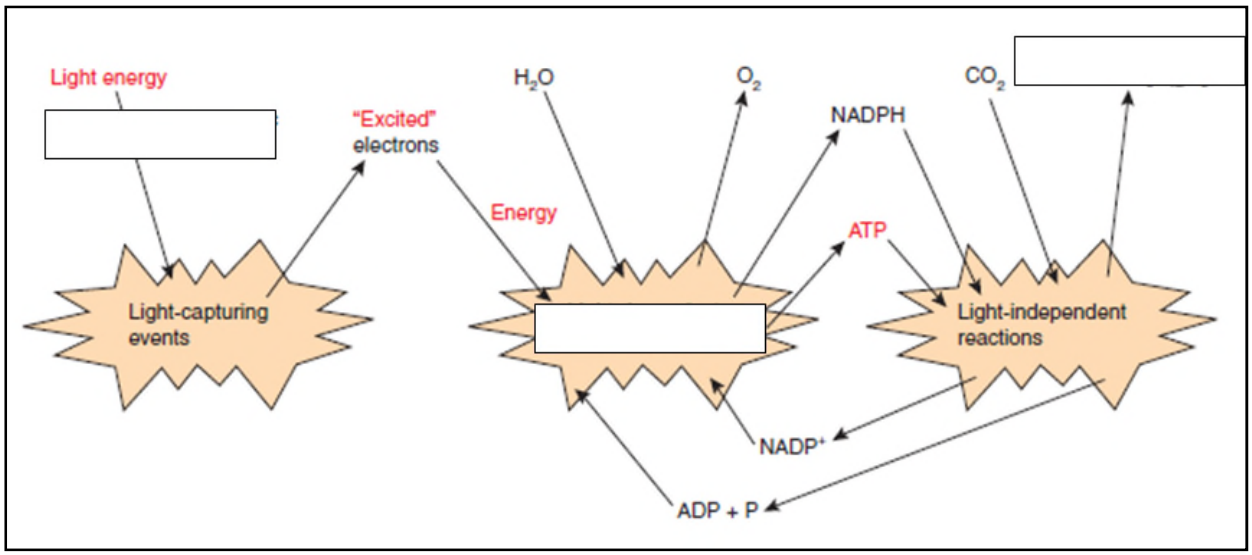
Words	Definitions
a- chloroplast b- strands c- nucleotides	1- Patterns that attach nucleotides together and spiral to create a structure called a double helix.
	2- Phosphoric esters of a nucleoside; the basic structural unit of nucleic acids (DNA/RNA)
	3- Plastid containing chlorophyll and other pigments in plants cells that carry out photosynthesis
	4- A pliable sheet of tissue that covers or lines or connects cells of plants.

Exercise three: Complete the table below using information from the passage.

Hybridisation is the process of crossing two genetically different individuals to result in a third individual with a preferred set of traits. Plants of the same species cross easily and produce fertile progeny whereas wide crosses are difficult and generally produce sterile progeny. In nature, some plants are cross-pollinated by insects (such as the oil palm) or by wind (such as maize or corn) while others (such as wheat and rice) are self-pollinated plants. Hybridization can be also accomplished through artificial techniques. Barriers should be overcome via gene transfer; it is expected that genes from wild relatives of cultivated plants will continue to correct defects in other wise high-yielding varieties.

……..… **of hybridisation**	**Results of hybridisation**	**Types**
The genetic crossing of two species to enhance plant traits	- ……. - sterile progeny	- cross- pollination - …….

Exercise four: The following figure represents the biochemical pathways of the photosynthesis process. Name the missing legends of this diagram



Thank you for your collaboration

APPENDIX III

LECTURE ONE

<u>Task 1:</u> Join the chat room at (Chatzy.com) and discuss whether you are for or against the use of genetic engineering techniques in modern agriculture by providing arguments to support your point of view.

<u>Task 2:</u> Look at the figure and answer the questions.

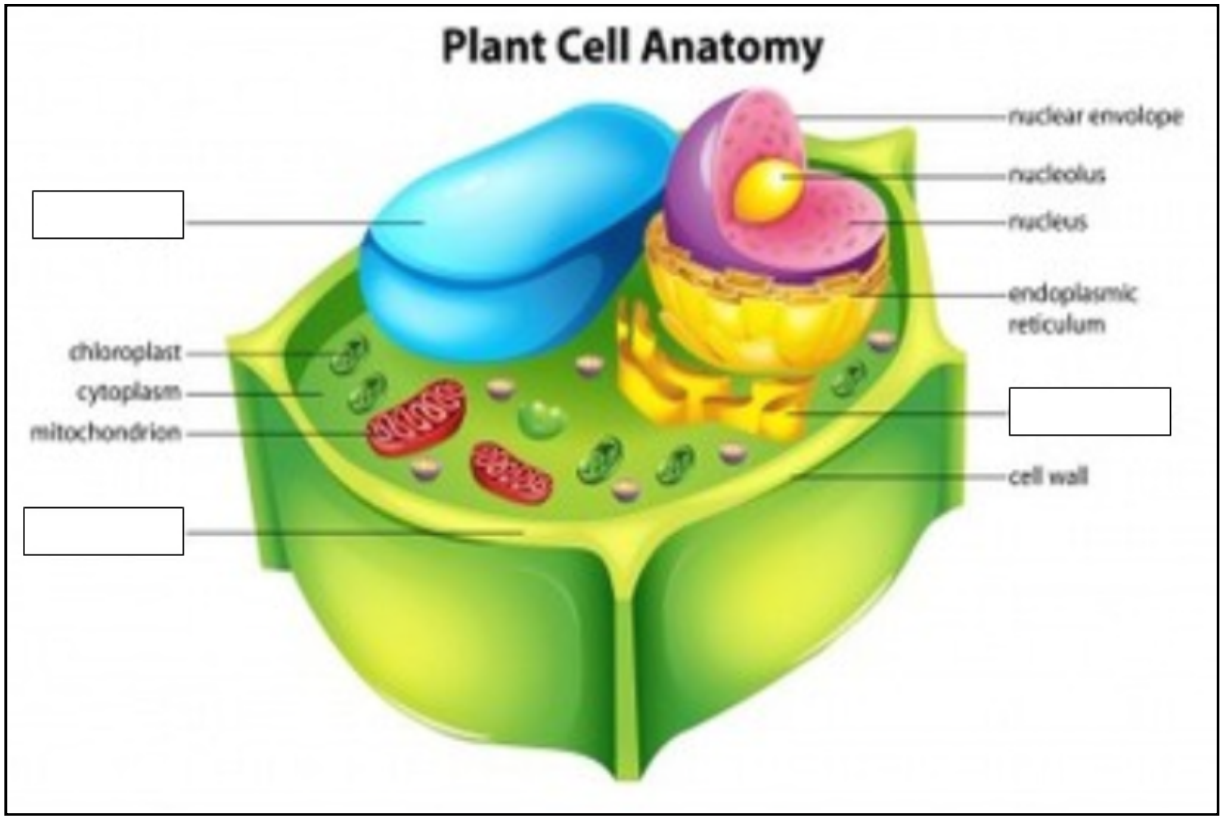


Figure: **Plant cell (Retrieved from https://www.123rf.com/photo_20060205_illustration-showing-the-plant-cell-anatomy.html)**

a- Fill in the gaps in the figure with appropriate legends: cell membrane – Golgi apparatus – vacuole

b- Complete the table below.

Nouns in singular	Nouns in plural
…….	chloroplasts
nucleus	…….
…….	mitochondria
leaf	…….
bacterium	…….
…….	species
…….	syntheses

c- Which parts of the cell contain the genetic code of the plant?

…….

d- How is it called when genes are transferred from one organism into another to enhance specific traits?

…….

<u>Task 3:</u> Classify the following statements about advantages and disadvantages of transgenic crops in the table.

a- poor farmers might become dependent on international corporations for seed.

b- improvement in land use and production of bio-fuel.

c- gene escape into non-GM crops and ecosystem disruption.

d- some crops are designed to carry antigenic proteins from infectious pathogens or to reduce allergenicity to certain products and potential improvements in nutritive value of plants.

e- improved crop productivity in poor areas and potential to produce medicines inexpensively.

f- unnecessary use of antibiotics promote the growth of the antibiotic resistant bacteria and potential risk of introducing allergens into food crops.

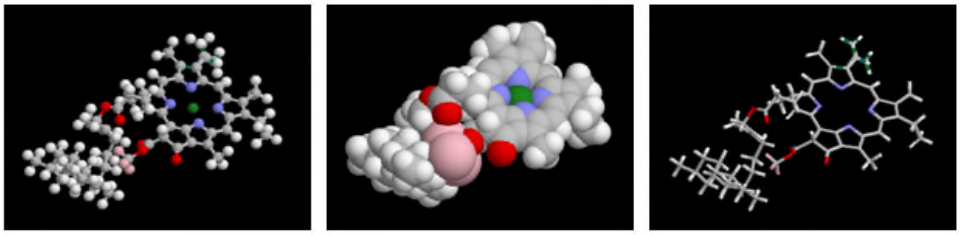
	Pros	**Cons**
Environmental issues		
Economic issues		
Food safety		

<u>Task 4:</u> Using the ideas in previous tasks, write a scientific article about the benefits of agricultural genetic engineering and transgenic crops.

APPENDIX IV

LECTURE TWO

<u>Task 1:</u> Use the software *Rastop* to open the molecule of the chlorophyll and then answer the following questions.



1 2 3

a- How is the molecule of the **chlorophyll** displayed in pictures 1 - 2 - 3?

……..

b- What do colours (red – white – green – blue – pink and grey) represent?

……...

c- How many bonds are found in the molecule of **chlorophyll**?

……...

<u>Task 2:</u> Read the text below about the chlorophyll and the photosynthesis and then answer the questions.

From space you can see that Earth is a green-blue planet. The green results from **chlorophyll** pigments found in algae, green plants leaves and certain bacteria that absorb light energy. Through the process of the photosynthesis, this light energy is transformed to

chemical-bond energy in the form of ATP that is then used to produce complex organic molecules (such as glucose…) from which organisms obtain energy through the process of cellular respiration.

The chlorophyll which is the green pigment found in the chloroplasts of plant cells which have two distinct regions: the grana and stroma is essential to the photosynthetic process which illustrates complex biochemical pathways: the light-capturing events, the light-dependent reactions, and the light-independent reactions. During the light-capturing process, Chlorophyll along with other photosynthetic pigments absorbs specific wavelengths of light. Thus, electrons become "excited" and can then enter into the chemical reactions responsible for the production of ATP. As a by-product, hydrogen and oxygen are also produced through light-dependent reactions. The oxygen from the water is released to the environment as O_2 molecules and the hydrogens are transferred to the electron carrier coenzyme $NADP^+$ to produce NADPH. All these reactions take place in the grana of the chloroplast. After that, the NADPH and ATP leave the grana and enter the stroma, where the light-independent or dark reactions *(*because light is not needed) take place. In these reactions, the resulting ATP and NADPH are used to attach CO_2 to a 5-carbon molecule, already present in the cell, to manufacture new, larger organic molecules. Ultimately, glucose ($C_6H_{12}O_6$) and hydrogens are produced and ATP and NADPH are turned back into ADP and NADP that are recycled back to the light-dependent reactions to be used over again.

To sum up, Photosynthesis is the process by which plants, algae, and some bacteria use the energy from sunlight to produce organic compounds through different operations. In the light-capturing events, the chlorophyll traps the energy of sunlight to manufacture a source of chemical energy (ATP) and a source of hydrogen (NADPH) later through the light-dependent reactions. Oxygen is also released in this stage. During the light-independent

reactions of photosynthesis, the ATP energy is used in a series of reactions (the Calvin cycle) to form a simple carbohydrate, glyceraldehyde-3-phosphate. In subsequent reactions, plants use the glyceraldehyde-3-phosphate as a source of energy and raw materials to make complex carbohydrates, fats, and other organic molecules.

(Concepts in Biology, 2007)

a- Which of these is the correctly balanced equation for the photosynthesis process?

a. $C_6H_{12}O_6 + 6\ O_2 \rightarrow 6CO_2 + 6\ H_2O$

b. $CO_2 + H_2O \rightarrow CH_2O + O_2$

c. $6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$

b- Complete the table below using information from the text.

Process	**Where in the Chloroplast**	**Reactants**	**Products**
Light-energy Trapping events	In the chlorophyll molecules	Chlorophylls	…….
…….	In the grana	…….	Oxygen, ATP, NADPH
Light-independent reactions	…….	Carbon dioxide, ribulose, ATP, NADPH	Glyceraldehyde-3-phosphate, ribulose, ADP, $NADP^+$

c- Find in the text words that are opposite in meaning to the following.

a- dependent #..... b- unexcited#.....

c- nonspecific#..... d- irresponsible#.....

d- Complete the chart below.

Verb	Noun	Adjective
……..	absorption	……..
……..	……..	processed
To synthesise	……..	……..
To depend	……..	……..
……..	cell	……..
……..	……..	reactive

<u>Task 3:</u> Summarize the text above using information in previous task. To explain the chronological order of the biochemical reactions occurring during the process of the photosynthesis, make use of time sequencers (first, second, third, then, next, after that, finally…etc)

APPENDIX V

LECTURE THREE

<u>Task 1:</u> The pictures below are for a biology experiment made in laboratory to extract and test the amount of the *Phosphatase* enzyme in germinating seeds of plants. Put these steps into the correct order.

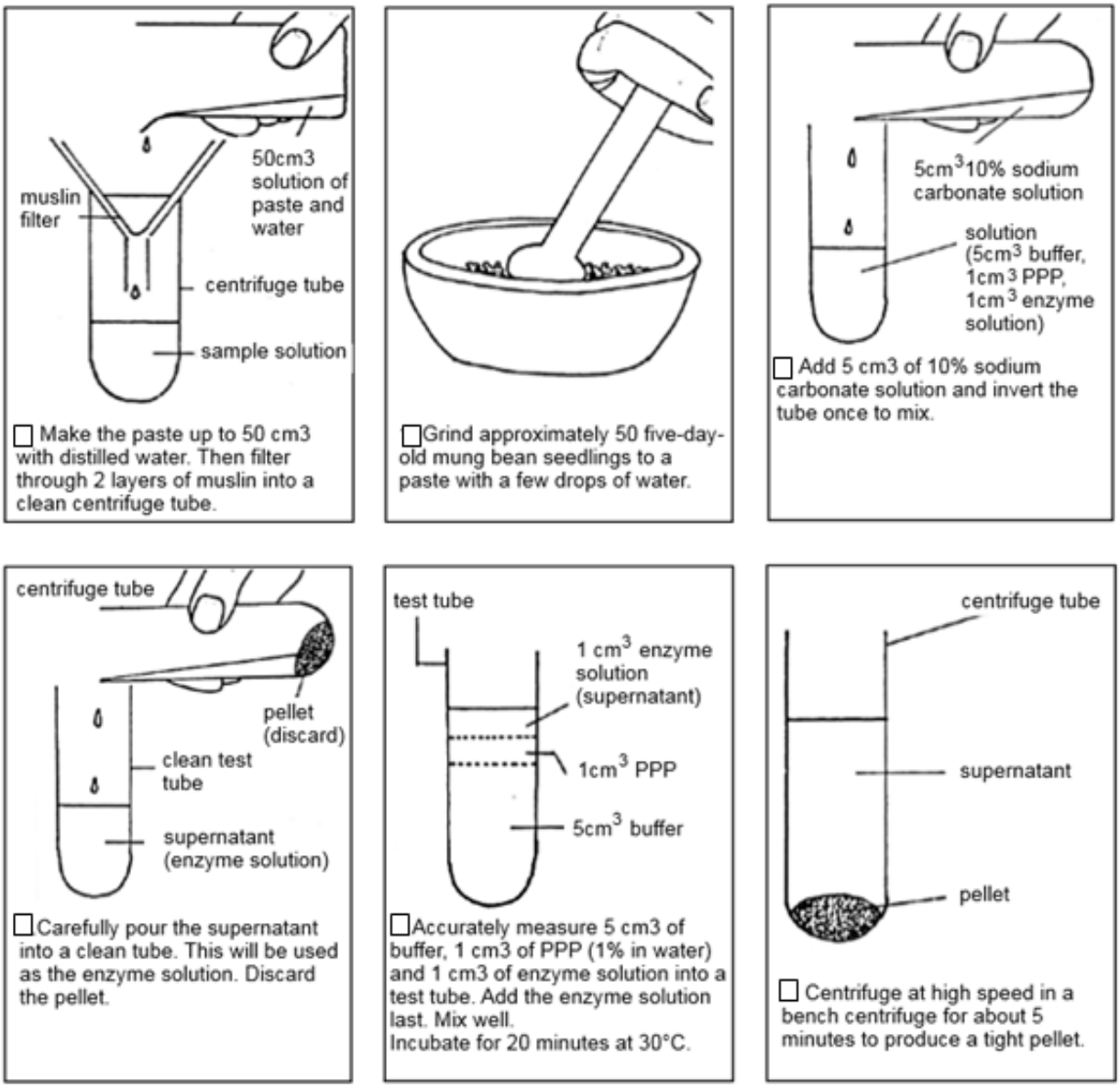


***Figure*: The experiment of extracting the *Phosphatase* enzyme. (Retrieved from www.saps.org.uk)**

<u>Task 2:</u> Nowadays enzymes are used for various reactions because they are bio-degradable and can be produced using biological sources. Amylase enzymes have various industrial applications like production of fructose syrups, safe detergents, baked products…etc (Experimental Biochemistry: A Student Companion, 2005)

- Watch the video (Retrieved from https://www.youtube.com/watch?v=MY7Vi6nSYBQ) about the *Beta amylase enzyme*, and then take the following quiz.

1) Beta amylase is the enzyme that cleaves the _____ bond of starch molecule.

a- α1,6

b- α 1,4

c- β 1,4

2) Starch is a _____.

a- Heteropolysaccharide

b- Homopolysaccharide

c- Monosaccharide

3) Why is Beta amylase an exoenzyme?

a- It hydrolyzes the glycosidic linkage from the reducing end of polysaccharides.

b- It is secreted out of the source.

c- It hydrolyzes the glycosidic linkage from the non-reducing end of polysaccharides.

4) Beta amylase acts on starch to give _____.

a- Maltose

b- Sucrose

c- Amylose

5) To extract β- Amylase from plants, _____ methods are used by biologists.

a- phytochemical

b- chemical

c- genetic

<u>Task 3</u>: Watch again the video about the experiment of isolation of *β- Amylase* from sweet potato and then combine steps of this procedure in column A with their corresponding parts in column B using the connectors provided.

A	connectors	B
Take a clean sweet potato and peel the skin off	before	the extract is filtered using a GFA glass fibre filter.
The sweet potato is transferred into a blender	when	it is cut and crushed in a mortar and pestle.
Add 40 ml of cold 20mM sodium phosphate buffer saline	as soon as	you note its weight.
The potato slurry is not transferred into a blue capped tube	while	the centrifugation of the filtrate at 12000rpm for 20 minutes at 4° C.

The filtrate is then collected in a new blue capped tube	after	blending the mixture.
Take out the tube, carefully transfer the supernatant into a new tube that must be stored at 4 degree Celsius in refrigerator and finally discard the pellet	until	the enzyme is allowed to extract for over one hour at room temperature, with frequent vigorous stirring on a vortex mixer.

<u>Task 4</u>: Using the ideas of stages in task 3, write a lab report about the experiment of extracting and identifying *β- Amylase* from sweet potatoes. Make use of the summary tactics in the handouts.

APPENDIX VI

HANDOUT ABOUT WRITING A LAB REPORT

A lab report is used to describe and analyze the procedures followed and data collected.

Choose a title:

Name of the experiment you are doing. The title should be descriptive, yet concise.

Introduction:

Determine the problem**.** Figure out what you are attempting to solve or test. This is the *purpose* of the experiment. When you explain the purpose of the experiment, explain what the experiment will be about and what you want to determine.

Determine the hypothesis. A hypothesis is the theoretical solution to the problem or predicted outcome to the test. You are creating an experiment to see if it is supported or not supported. An example of a hypothesis is: If I throw a ball from a fifteenth story balcony, it will make a crack in the sidewalk.

Methods and materials:

Make a list of materials. The next step is to write the materials used in a clear, concise list. This will allow anyone to repeat your experiment and verify your claims.

Explain your procedure. Write down the exact steps you followed during your experiment and the exact measurements you took. This takes you through a step by step procedure of the lab. Make sure to outline any precautions that should be taken when performing the experiment.

Results and discussion:

Discuss the results. In this section, analyze the experiment. Interpret the results by explaining them, analyzing what they mean, and comparing them.

Accept or reject your hypothesis. In the conclusion, explain if your hypothesis was correct or incorrect. Use data obtained from the experiment to support why you accept or reject it.

APPENDIX VII

CONTROL GROUP SCORES IN THE PRE-TEST AND POST-TEST

Student 1	Pre-test	Post-test	Results
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	0	0	=
Total	07	07	=

Student 2	Pre-test	Post-test	result
Exercise 1	3	1	_
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	1	1	=
Total	08	07	+

Student 3	Pre-test	Post-test	result
Exercise 1	3	1	_
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	1	0	_
Total	08	06	_

Student 4	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	1	0	_
Total	08	07	+

Student 5	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	1	0	_
Total	08	07	+

Student 6	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	1	_
Exercise 3	1	2	+
Exercise 4	0	3	+
Total	06	08	+

Student 7	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	1	1	=
Total	08	09	+

Student 8	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	1	_
Exercise 3	2	2	=
Exercise 4	0	2	+
Total	07	08	+

Student 9	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	3	3	=
Exercise 3	2	2	=
Exercise 4	2	1	_
Total	10	08	_

Student 10	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	3	3	=
Exercise 3	2	2	=
Exercise 4	1	1	+
Total	09	08	_

Student 11	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	3	1	_
Exercise 4	0	0	=
Total	08	06	_

Student 12	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	1	_
Exercise 3	0	1	+
Exercise 4	0	1	+
Total	05	05	=

Student 13	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	3	3	=
Exercise 4	0	2	+
Total	08	10	+

Student 14	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	3	2	_
Exercise 4	0	2	+
Total	08	09	+

Student 15	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	2	1	_
Exercise 4	0	0	=
Total	07	06	_

APPENDIX VIII

EXPERIMENTAL GROUP SCORES IN THE PRE-TEST AND POST-TEST

Student 1	Pre-test	Post-test	result
Exercise 1	2	3	+
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	1	2	+
Total	07	10	+

Student 2	Pre-test	Post-test	result
Exercise 1	3	2	_
Exercise 2	2	3	+
Exercise 3	2	3	+
Exercise 4	2	2	=
Total	09	10	+

Student 3	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	0	2	+
Exercise 4	0	2	+
Total	05	10	+

Student 4	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	0	3	+
Exercise 4	0	0	=
Total	05	09	+

Student 5	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	1	3	+
Exercise 3	1	3	+
Exercise 4	1	3	+
Total	06	12	+

Student 6	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	3	3	=
Exercise 4	1	3	+
Total	09	12	+

Student 7	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	2	3	+
Exercise 4	2	3	+
Total	09	12	+

Student 8	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	2	3	+
Exercise 4	1	3	+
Total	08	12	+

Student 9	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	2	2	=
Exercise 4	0	2	+
Total	07	10	+

Student 10	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	1	3	+
Exercise 3	2	3	+
Exercise 4	1	2	+
Total	07	11	+

Student 11	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	1	1	=
Exercise 4	0	2	+
Total	06	09	+

Student 12	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	0	3	+
Exercise 4	0	2	+
Total	05	11	+

Student 13	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	1	1	=
Exercise 4	0	2	+
Total	06	09	+

Student 14	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	3	3	=
Exercise 3	2	3	+
Exercise 4	0	2	+
Total	08	11	+

Student 15	Pre-test	Post-test	result
Exercise 1	3	3	=
Exercise 2	2	3	+
Exercise 3	1	2	+
Exercise 4	1	2	+
Total	07	10	+

Résumé

La langue à des fins spécifiques (LSP) sert à combler le fossé existant entre les exigences des futures professions et ce que les apprenants rencontrent réellement dans les classes de langues. En raison de la mondialisation et de l'augmentation considérable de la communication internationale dans divers domaines, la demande pour l'anglais à des fins spécifiques (ESP) augmente en Algérie. Malgré ce besoin, l'enseignement d'ESP est toujours limité aux méthodologies traditionnelles, comme l'approche basée sur le genre. Croyant au rôle essentiel que peuvent jouer les méthodologies adéquates dans la promotion d'un cours de ESP, l'étude actuelle a pour objectif de mettre en lumière une méthodologie innovante, appelée méthodologie profonde ou «deep-end» ; en étudiant l'impact de l'utilisation de cette approche sur l'aspect linguistique le plus important qui est le vocabulaire. Ainsi, il est supposé que dans le cas où la méthodologie profonde est implémentée dans l'enseignement ESP, les apprenants amélioreraient leur stock de vocabulaire et amélioreraient leurs stratégies d'apprentissage du vocabulaire. Pour cela, une recherche expérimentale a été menée auprès d'un échantillon de 30 étudiants du département de biologie de la Faculté des Sciences et Technologies du centre universitaire de Boussouf, Mila, Algérie. Pour examiner l'efficacité du traitement, un pré-test et un post-test ont été administrés aux deux groupes (expérimental et contrôle).Sur la base des résultats statistiques utilisant le test t de Student, les résultats du groupe expérimental dans le post-test étaient remarquablement meilleurs que ceux de leurs homologues dans le groupe témoin. Les données obtenues indiquent qu'un cours ESP intégrant la méthodologie de 'base profonde' a pu effectivement aider les apprenants à développer leur vocabulaire. À la lumière de ces résultats, la méthodologie «deep-end» est recommandée dans les cours ESP aux universités algériennes.

ملخص

تعمل اللغة لأغراض خاصة على سد الفجوة القائمة بين متطلبات المهن المستقبلية وما يواجهه المتعلم بالفعل في فصول اللغة. بسبب العولمة والزيادة الهائلة في الاتصالات الدولية في مختلف المجالات ، فإن الطلب على اللغة الإنجليزية لأغراض معينة اخذ في التوسع في الجزائر. على الرغم من هذه الحاجة ، لا تزال برامج الانجليزية لأغراض خاصة مقتصرة على المنهجيات التقليدية ، مثل المنهج القائم على أساس النوع. وإيمانا منا بالدور الأساسي الذي يمكن أن تلعبه المنهجيات اللازمة في تحسين أداء هذه دورات ، فإن تركيز الدراسة الحالية هو دراسة تأثير استخدام منهجية مبتكرة ، يطلق عليها "المنهجية العميقة" على الجانب اللغوي الأكثر أهمية ، ألا وهو المفردات. وبالتالي ، فإنه من المفترض أنه في حالة تنفيذ المنهجية العميقة في تعليم الانجليزية لأغراض خاصة ، فإن المتعلمين سيعززون مخزون المفردات ويحسنون استراتيجيات تعلم المفردات الخاصة بهم. لهذا ، تم إجراء بحث تجريبي شمل عينة من 30 طالباً من قسم الأحياء ، كلية العلوم والتكنولوجيا في المركز الجامعي لبوالصوف ، ميلة ، الجزائر. من أجل دراسة مدى فعالية المعالجة، تم إجراء اختبار قبلي و اختبار بعدي لكلي الفوجين (التقييمي و الضابط). استنادًا إلى النتائج الإحصائية ، كانت نتائج الفوج التقييمي في الاختبار البعدي أفضل بشكل ملحوظ من نتائج نظيره (الفوج الضابط). تشير البيانات التي تم الحصول عليها إلى أن دورة الانجليزية لأغراض خاصة التي تدمج المنهج العميق تساعد المتعلمين على تحسين مفرداتهم. في ضوء هذه النتائج ، يوصى باستخدام هذه المنهجية في دورات تعلم الانجليزية لأغراض خاصة في الجامعات الجزائرية.