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**The Impact of Translation on Reading Comprehension for
English for Science and Technology Learners
A Case Study of Computer Science Students**

Thesis submitted to the Department of Letters and the English Language in
candidacy for the degree of LMD doctorate in Applied Linguistics

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To my Mother, my Father, my Wife and my Daughter . . .

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Abstract

This research is about studying the impact of using the Mother Tongue (MT) or translation on English for Science and Technology (EST) learning. Two main contributions are proposed. The first is an experiment-based study of how EST students' learning is correlated to the presence/ban of the MT/translation in the EST classroom. To confirm/dis-confirm the research hypothesis, "If EST is taught using translation, this will improve the students' comprehension abilities", we opted for a pre-test post-test control experimental group design. Statistical analyses showed a statistically significant improvement of the group that had had some extra activities of translation. This confirms the hypothesis of research. For the second contribution, we administered a questionnaire, that targeted the same population, to study the learners' attitudes towards the use of the MT or translation in the EST classroom. The results showed that the respondents had positive attitudes towards the use of Arabic (their mother tongue) in EST classrooms. EST students at Constantine 2 University, the population targeted in this research, were with the use of Arabic (their MT) or French in the classroom, but they think it better that the teacher keeps using English only. On the basis of the obtained results, some recommendations are proposed to EST practitioners to help in exploiting the MT/translation potential in the EST classroom.

ملخص

نقدم في هذه الأطروحة دراسة تجريبية لجدوى استعمال الترجمة واللغة الأم خلال حصص اللغة الإنجليزية العلمية عند تدريس طلبة العلوم والتكنولوجيا. نقدّم في الشق الأول للأطروحة دراسة تجريبية يتحقق الباحث من خلالها من مدى نجاعة استعمال اللغة الأم أو الترجمة في تحسين التلقي عند طلبة الإنجليزية كلغة علمية. قمنا بتقسيم المجموعة المدروسة لفوجين، حيث سُمح للأستاذ والطلبة باستعمال العربية أو الفرنسية مع أحد الفوجين خلال حصة الإنجليزية، أساسا لغرض شرح أو السؤال عن المفردات والمفاهيم الصعبة. أما الفوج الآخر فلم تُستعمل معه إلا الإنجليزية كوسيلة للشرح والتخاطب. تم اختبار مستوى الفهم لدى الطلبة من خلال إجراء فحوصين لكلا الفوجين، أحدهما قبل التجربة والآخر بعد تدريس الفوجين خلال فصل كامل. أثبتت الدراسة الإحصائية أن الفوج الذي استعملت معه الترجمة تفوق على الآخر في التعبير عن معاني مجموع المصطلحات التقنية التي احتواها نص الفحص. في الشق الثاني من الأطروحة، نقترح دراسة تحليلية حول مدى القبول الذي يعرفه استعمال الترجمة أو اللغة الأم خلال حصص الإنجليزية العلمية. أثبتت النتائج المحصل عليها قبولاً نسبياً للطلبة لاستعمال اللغة الأم (العربية)، الفرنسية أو الترجمة خلال حصص اللغة الإنجليزية للعلميين.

Résumé

Dans cette thèse, nous étudions l'impact de l'utilisation de la traduction ou la langue maternelle dans un cours d'anglais pour les sciences et les technologies sur le niveau de compréhension des apprenants. Dans une première contribution, la traduction a été utilisée au cours des séances d'anglais pour la clarification du sens des mots, des expressions et des notions introduites dans les textes étudiés. Deux échantillons d'étudiants de Master 1 de la faculté des NTIC de l'université Constantine 2 ont fait l'objet de l'analyse expérimentale. Pour le premier, seul l'anglais a été utilisé comme moyen de communication et de présentation du cours. Pour le deuxième, l'utilisation du français et/ou de l'arabe par l'enseignant et même de la part des étudiants a été permise. Deux tests ont été donnés, l'un au début du semestre et l'autre à la fin, suivis par une analyse statistique des résultats. Les résultats obtenus prouvent la validité de l'hypothèse de recherche: 'L'utilisation de la traduction dans la séance d'anglais pour les sciences et les technologies aide à la compréhension du contenu présenté'. Dans une deuxième contribution, l'analyse des attitudes des apprenants envers l'utilisation de la langue maternelle, le français ou la traduction dans les cours d'anglais pour les sciences et les technologies a été visée. Les résultats obtenus ont reflété des attitudes positives envers l'utilisation de l'Arabe et du Français, ainsi que la traduction dans les cours d'anglais de spécialité.

List of Abbreviations

CLT: Communicative Language Teaching

EFL: English as a Foreign Language

EGP: English for General Purposes

ELT: English Language Teaching

ESP: English for Specific Purposes

ESL: English as a Second Language

EST: English for Science and Technology

EVP: English for Vocational Purposes

MT: Mother Tongue

NA: Needs Analysis

PSA: Present Situation Analysis

TL: Target Language

TSA: Target Situation Analysis

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General Introduction

1. Statement of the Problem

A common problem raised by English for Science and Technology (EST) teachers in the New Technologies of Information and Communication (NTIC) Faculty of Constantine 2 University¹ is that a considerable number of their students claim they are unable to understand most of the presented lessons. The main reason mentioned by the students is the use of English as the unique medium of communication in the classroom. It is a fact that many teachers prefer not to use any other language but English in the classroom, to avoid putting students, as they believe, at a non-return spot in which students' fluency and spontaneity in using English will be negatively affected by the use of a different language. However, students constantly declare that they would never be able to learn a language they do not understand if the unique means of communication during classes is that language itself. Besides, they argue that they solely need the understanding of the documents in their fields as EST learners.

Generally speaking, students in scientific and technical fields tend to give more importance to scientific and technical subjects than language courses. Consequently, their linguistic skills are generally limited, which makes them face many difficulties if the lesson is totally given in English. Computer science students at Constantine 2 University are no exception. The in-class observations² of computer science students

¹This faculty is also called: 'NTIC Faculty', 'computing Faculty' and 'computer science Faculty', thus these names will be used interchangeably in this manuscript.

²These observations are done by the author of this work himself.

at Constantine 2 University revealed that using the students' Mother Tongue (MT) or a language that students know better than English (French in this case) may boost their interest in English as a module and would make them feel linguistically safe and more motivated during English classes. This has made us think that the use of the MT or translation in EST classrooms may be beneficial to EST learning.

2. Aims of the Study

This thesis investigates the impact of using translation for EST teaching on students' linguistic abilities. The EST learners' attitudes towards the use of L1/translation in the EST classroom is also studied. Further, we propose a framework for helping in introducing translation as an activity in EST lessons.

3. Research Questions and Hypotheses

Two main contributions are proposed in this work; in the first we study whether L1/translation use in EST classrooms is beneficial, in the second we investigate EST learners' attitudes towards the use of their mother tongue or translation in the classroom. Hence, we opted for the following research questions:

- (1) To what extent can the use of translation or the MT in EST classrooms be beneficial to improve the students' comprehension of the presented material?
- (2) What are the attitudes of EST learners towards the use of L1/translation in EST classrooms?
- (3) If L1/translation were used as a pedagogical tool, what are the students' preferences with respect to the language aspects to be targeted?
- (4) What is the learners' language preference, Arabic or French, to be used as a facilitation signal during EST sessions?
- (5) What are the conclusions that could be drawn regarding the current situation

of EST in the Faculty of New Technologies of Information and Communication, Constantine 2 University?

- (6) If translation or the MT were used in EST classrooms, what is the methodology to be adopted?

It imports to mention that the two first queries form the initial questions of research, and the others have emerged as a logical result.

For the first contribution, it was assumed that “students, especially in scientific and technical fields, would feel at ease and be more interested if they were taught English through translation activities. It was hypothesised that “if teachers used translation activities when teaching English for science and technology, this would improve the learners’ comprehension abilities”. As far as the second contribution is concerned, it was hypothesised that “the EST students in the Faculty of New Technologies of Information and Communication of Constantine 2 University would have positive attitudes towards the use of translation or the MT in the classroom”.

4. Research Variables

Three variables, one dependent and two independent, have risen from the first-contribution hypothesis of research and from the experimental design for which we opted. The dependent variable is the learners’ comprehension of the presented material. The independent ones are the introduction of translation on the one hand and time on the other hand. In fact, the latter variable resulted from the experimental test design chosen: ‘a pre-test post-test control experimental group design’. The dependent variable is quantitative and measured by a marking system, while the independent ones are of a qualitative nature. The second contribution is a questionnaire-based analysis of students’ attitudes. So, we have not had to explicitly define any variables because no treatment has been introduced on a variable to see what effect such a variable has on another one.

5. Sample of the Study

As far as the subjects of study are concerned, both contributions took place in the Faculty of New Technologies of Information and Communication, Constantine 2 University. For the first contribution, two groups, of 25 students each, were randomly selected from a class of computer science first year Master students. These two groups constituted the control and experimental groups. The respondents to the questionnaire devised for the second contribution were also first year Master students at the same faculty, 63 students on the whole. Even the in-class observations on which we based our pedagogical implications took place during EST sessions taught by the author for the same population of learners.

6. Tools of Research

To check the research hypotheses, a test-based approach was used for the first contribution and a questionnaire was devised for the second. For the first contribution, the experimental group was taught without any use of translation during EST classes. The control group was taught introducing some translation. A pre-test was devised and taken by both groups in order to evaluate their initial comprehension abilities of EST texts. After that, both groups were taught EST for a whole semester with the introduction of translation or allowing the MT use when teaching the experimental group, while only English was used with the control group. Next, both groups underwent a post-test. Finally, an inferential statistical analysis took place to explore the nature of correlation, if any, between the variables of research.

For the second contribution, studying the attitudes of the learners towards translation use in EST classrooms, a questionnaire was administered. The students were asked to respond to some questions that revolve mainly around their perception of the use of the MT or translation activities in the EST classroom. The collected data was then analysed.

7. Structure of the Thesis

This thesis comprises five chapters organised in two parts: The state of the art and contributions. In the first chapter, a brief description of English for Specific Purposes (ESP) is given. EST as a variety and originator of ESP is also presented and contextualised in the same chapter. The focus is put on the specificity of purpose in EST. The second chapter offers a theoretical study of the arguments against and those supporting the use of the MT or translation in EFL classrooms. The chapter begins with a presentation of the type of relation that may exist between translation, L1/MT and EFL. Then, the arguments that have been reported in the literature as reasons to ban the use of the MT in the EFL classroom are presented, the pros of the MT use are next detailed. The same scheme of analysis is introduced for the case of translation; the arguments against are given, and finally, the arguments supporting its use are presented.

In the third chapter, both the rationale of the first contribution and its validity testing are detailed. Mainly, the effect of using translation on EST learners' reading comprehension abilities is studied. The fourth chapter aims at describing the second contribution. A brief description of the rationale, the question of research and the hypothesis are first given. Then, the method is described. Next, the devised questionnaire is presented. The results are finally introduced and discussed. The fifth chapter is composed of two parts. The first part explores how the use of L1/translation in EFL/EST has been implemented in the literature, and discusses the applicability of those works' recommendations to the Constantine 2 University EST classrooms. An attempt to devise a general methodology for including the L1 or translation activities in an EST course is eventually attributed to the second part of this chapter. Finally, a round-up of all what is presented as contributions or findings throughout the five chapters is given in the General Conclusion.

Part I

State of the Art and Literature

Review:

- English for Specific Purposes
- English for Science and Technology
- Translation for EFL Learning

**English for Specific Purposes and English for
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Introduction

The contributions proposed in this work are about the impact of using the Mother Tongue (MT) or translation on English for Science and Technology (EST)

learning, so we thought it is crucial to dedicate a separate chapter to EST. After having read many founding and recent state-of-the-art works, it was found that another important concept has a strong relationship with EST, it is English for Specific Purposes (ESP). In fact, the two terms have been used interchangeably in a wide range of literature, even if some authors state explicitly that EST is a sub-branch of ESP. This could be justified by the fact that ESP at its beginnings focused on science and technology as the main fields of analysis and study. Another reason for this interchangeability of terms is due to the applicability of almost all research findings in one sub-branch to the other. This point is detailed in Section 1.5.

This chapter starts with setting the scene by presenting ESP as a field of research in the broader field of English Language Teaching (ELT). The stages of its evolution and the main definitions provided in the literature for ESP/EST are summarised. Then, we report the categorisations existing for ESP. Next, the role of needs analysis in ESP is given. Finally, the EST as a type and as an originating version of ESP is presented with special focus on presenting the contributions of pioneering works.

1.1 English for Specific Purposes - Definition

Dudley-Evans and St John [1998:1] state that “The study of languages for specific purposes has had a long and interesting history going back, some would say, as far as the Roman and Greek Empires.” The specificity of purpose is a crucial part of any foreign language course design; whatever the language or its future uses are. Though, it was only from the 1960s that ESP became a fully-fledged discipline within the sphere of language teaching.

Although many books and research articles have been published to describe and study the language use in special/specific contexts and situations, no consensus has been reached on what ESP means. Even, a few years ago, many ESP researchers have not been rather totally aware that they are working in an ELT sub-field that

would be known as English for specific purposes. Therefore, there is no clear unique standard definition of ESP in the literature, but we try to give some definitions that we found researchers agreed upon in the ESP-related literature. As summarised by Anthony [1997], there exist two main general perspectives to define ESP. He argues that ESP is a variant of English that is taught for ‘specified’ purposes according to some people, and is the type of English taught for ‘academic and professional or vocational’ uses according to others.

The specificity expressed by the word ‘specific’ in ESP definition, as Munby [1978] says, is indicative to concentrating on some characteristics of the language which are directly correlated to the restricted use of the foreign language and required by the learner for fulfilling a particular purpose. Robinson [1991] simplifies the idea when telling that ESP is the use of a particular variety of the language in a specific context of use. Munby [1978] stresses this specificity of purpose when stating that the course design is based essentially on the learners’ communicative needs; he says:

ESP courses are those where the syllabus and materials are determined in all essentials by the prior analysis of communicative needs of the learner, rather than by non-learner centred criteria such as the teacher’s or institution’s predetermined preference for General English or for treating English as part of a general education [Munby 1978:2].

In this statement, not only the specificity of purpose is emphasised, but also the communicative aspect of language. The ‘restriction of competence’, the notion of ‘tasks’ and ‘training’ are the main aspects mentioned in the definition of ESP given by Widdowson [1983] who says that:

ESP is essentially a training operation which seeks to provide learners with a restricted competence to enable them to cope with certain clearly defined tasks. These tasks constitute the specific purposes which the ESP course is designed to meet [Widdowson 1983:6].

The enumeration of two sets of characteristics is the strategy adopted by Strevens [1988] to define ESP. He cites four *absolute* and two *variable* characteristics of ESP. In absolute characteristics, he proposes that ESP is:

- designed to meet specified needs of the learner;
- related in content (that is in its themes and topics) to particular disciplines, occupations and activities;
- centred on language appropriate to those activities in syntax, lexis, discourse, semantics and so on, and analysis of the discourse;
- in contrast with ‘General English’.

According to the same scholar, the variable characteristics are about the idea that ESP:

- may be restricted to the learning skills to be learned (for example reading only);
- may not be taught according to any pre-ordained methodology.

Dudley-Evans and St John [1998:4-5] developed this characteristics-based definition of ESP, given by Strevens. Their version, on the basis of absolute and variable characteristics, is as follows. For absolute characteristics they propose that ESP:

- is designed to meet specific needs of the learner;
- makes use of the underlying methodology and the activities of the discipline it serves;
- is centred on the language (grammar, lexis, register), skills, discourse and genres appropriate to these activities;

As far as variable characteristics are concerned, these authors suggest that ESP:

- may be related to or designed for specific disciplines;

- may use, in specific teaching situations, a different methodology from that of general English;
- is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be used for learners at secondary school level;
- is generally designed for intermediate or advanced students. Most ESP courses assume basic knowledge of the language, but it can be used with beginners.

This definition differs from that given by Strevens in two main points:

- (i) The absolute characteristic that puts ESP in contrast to ‘General English’ is deleted.
- (ii) Significant changes are made with regard to the relative characteristics of ESP. The authors state that ESP is not necessarily related to a specific discipline; and they mention the likeliness of ESP courses to be devised for adult learners, having already some basic knowledge of the language without excluding young people and beginners from getting profit from ESP courses.

1.1.1 Specificity of Purpose as a Feature of ESP – ESP vs EGP

It is a fact that every ELT course has its well-defined purposes. What makes ESP different from English for General Purposes (EGP) is not the specificity of purpose; it is the awareness of both the teacher and learners of the course purposes. This has been clearly stated by Widdowson [1983:5] who considers that:

an ESP course is in one sense really no more specific in its purposes than is one designed for general purpose English teaching (GPE for short). Syllabus designers and textbook writers have customarily worked to quite exact specifications, drawn up with reference to inventories of language items of one sort or another and directed at purposes represented by different stages of achievement, themselves defined by reference to some notion of eventual aims. In this respect, GPE is no less specific and purposeful than ESP. What distinguishes them is the way in which purpose is defined, and the manner of its implementation.

The just-mentioned difference between ESP and EGP is better clarified in Table 1.1

Table 1.1: ESP vs GPE, Objectives and Implementation [Widdowson 1983:7]

ESP	Specification of objectives: equivalent to aims	Training: Development of restricted competence
EGP	Specification of objectives: leads to aims	Education: Development of general capacity

Hutchinson and Waters [1987:53] point out the difficulty to make a clear distinction between ESP and EGP when saying that this difference is “in theory nothing, in practice a great deal.” They add: “What distinguishes ESP from General English is not the existence of a need as such but rather an awareness of the need.” In practice, the tradition persists in General English that the learner’s needs cannot be specified while needs analysis could be considered as the irreducible minimum of an ESP approach to course design [ibid: 54].

Nowadays, EGP teachers, or syllabus designers at least, are more aware of the importance of analysing learners’ needs and taking them into consideration [Tahir 2009]. Nevertheless, in practice those needs are very often disregarded during the learning process. On the other hand, ESP practitioners give great interest to implementing the goals of the learners dictated by the needs analysis phase.

1.2 Emergence of ESP: A New Branch of ELT

It may be noticed that as in many human activity fields, ESP is a phenomenon that grew out of a number of converging trends. It is neither a planned nor a coherent movement. According to Hutchinson and Waters [1987], there are three main reasons that contributed to the emergence of ESP:

- (1) The post-war demands that were motivated by the increasing role of the United States in the international scene and the development of technology and commerce, this transformed English into the standard accepted language in the scope. Learning English subsequently became almost a necessity for many people all around the world to accomplish with no trouble their activities. In addition, time and money constraints created a need for *cost-effective courses with clearly defined goals* and the purpose-free courses seemed no longer appropriate.
- (2) The new tendency of linguists to focus on the use of language, i.e. on describing the way language is used in different situations by different groups of people, more than focusing on the usage of language, i.e. the formal rules prescribing the way of its use.
- (3) The developments in educational psychology which placed the learner at the centre of pedagogues' attention. Learners were seen to employ different learning strategies, apply different skills, come up with different learning schemata, and all those entities were motivated by different needs and interests. Accordingly, it has been admitted that taking into consideration learners' needs and interest would have a significant influence on their motivation to learn and therefore on the effectiveness of their learning.

In the late 1960s and the 1970s, there was an immense increase in researching particular areas of English as it can be seen in the attempts of describing English for Science and Technology by Ewer and Latorre [1969], Swales [1971], Selinker

and Trimble [1976] and many others. In this phase, the aim was to identify the grammatical and lexical features through analysing the language used in the specific area of study or work. These linguistic features obtained from register analysis were then used as the syllabus of the ESP course.

In a second stage, the analysis went beyond the sentence level, considered in the first phase, and ESP became closely involved with the emerging field of discourse or rhetorical analysis. Allen and Widdowson [1974], as cited in [Hutchinson and Waters 1987], expressed the basic hypothesis of this stage:

We take the view that the difficulties which the students encounter arise not so much from a defective knowledge of the system of English, but from an unfamiliarity with English use, and that consequently their needs cannot be met by a course which simply provides further practice in the composition of sentences, but only by one which develops a knowledge of how sentences are used in the performance of different communicative acts.

Table 1.2 is the chart devised by Selinker et al. [1978:312-313] to illustrate this approach.

The third stage of ESP development took into consideration the learners reasons for learning, in addition to language analysis. It was based first on the identification of the target situation and then on a rigorous analysis of the linguistic features of that situation. Those features will form the syllabus of the ESP course. The system set by John Munby in 'Communicative Syllabus Design' [Munby 1978], gave a thorough explanation of the process implying the production of the detailed specification of the learner's needs required to be placed at the centre of the course design process.

In a fourth stage, the focus was put on the learning strategies, i.e. the thinking processes that underlie the different skills in language use. Significant contributions in the area of skills and strategies were made within projects such as the National ESP Project in Brazil and the University of Malaya ESP Project [Hutchinson and

Table 1.2: Rhetorical Process Chart of Selinker et al. [1978:312-313]

Level	Description of Level
<i>A. The objective of the total discourse</i>	
Examples:	<ol style="list-style-type: none"> 1. Detailing an experiment 2. Making a recommendation 3. Presenting new hypotheses or theory 4. Presenting other types of EST information
<i>B. The general rhetorical functions that develop the objectives of Level A</i>	
Examples:	<ol style="list-style-type: none"> 1. Stating purpose 2. Reporting past research 3. Stating the problem 4. Presenting information on apparatus used in an experiment <ol style="list-style-type: none"> a) Description b) Operation 5. Presenting information on experimental procedure
<i>C. The specific rhetorical functions that develop the general functions of level B</i>	
Examples :	<ol style="list-style-type: none"> 1. Description : physical, function, and process 2. Definition 3. Classification 4. Instructions 5. Visual – verbal relationships
<i>D. The rhetorical techniques that provide relationships within and between the rhetorical units of Level C</i>	
Examples :	<ol style="list-style-type: none"> I. Orders <ol style="list-style-type: none"> 1. Time order 2. Space order 3. Causality and results II. Patterns <ol style="list-style-type: none"> 1. Causality and results 2. Order of importance 3. Comparison and contrast 4. Analogy 5. Exemplification 6. Illustration

Waters 1987]. Those projects were elaborated to cope with the study situations where the medium of instruction is the mother tongue and were concentrated on reading strategies which are universal, i.e. they are not subject-specific [BritCouncil 1980].

In the fifth stage of ESP development, a shift was made from concentrating on language use toward concentrating on language learning. Hutchinson and Waters stated:

We cannot simply assume that describing and exemplifying what people do with language will enable someone to learn it. If that were so, we would need to do no more than read a grammar book and a dictionary in order to learn a language. A truly valid approach to ESP must be based on an understanding of the processes of language learning [Hutchinson and Waters 1987:14].

1.3 Classification of English for Specific Purposes

Munby [1978]) classified ESP into two major categories:

- (1) English for Occupational Purposes (EOP): when English is needed to perform a part of all the professional duties of the participant, e.g. working in civil aviation or tourism;
- (2) English for Academic Purposes (EAP): when English is needed to pursue a part or all of the participant's studies within a given discipline, e.g. studying medicine or computer sciences.

Another widely adopted classification of ESP could be found in [Hutchinson and Waters 1987:17] within the tree of ELT, illustrated in Figure 1.1. It is clear that this classification considers the academic or the occupational purposes as a secondary criterion, after considering the field of practice as a primary criterion, for classifying ESP.

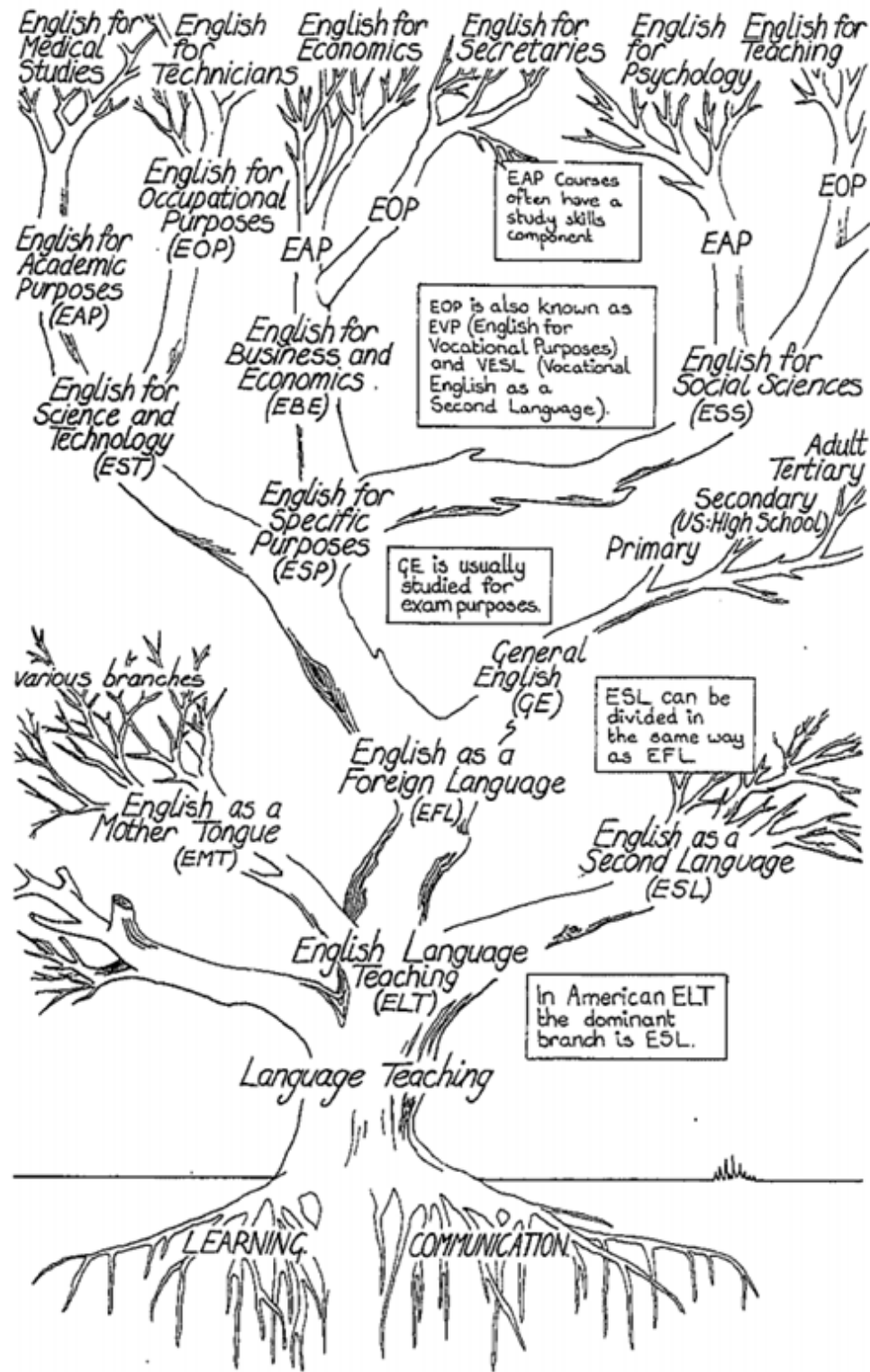


Figure 1.1: The ELT Tree of Hutchinson and Waters [1987:17]

From another perspective, Dudley-Evans and St John [1998] based their classification on ESP Munby's division, but they further subdivided the EOP into two sub-categories: EPP (English for Professional Purposes) and EVP (English for Vocational Purposes), see the chart in Figure 1.2.

1.4 Needs Analysis and English for Specific Purposes

Almost all the ELT specialists are unanimous in considering the important role of needs analysis in the process of designing and implementing any language course [Songhori 2008]. This importance is more obvious in the case of an ESP course. Robinson [1991:13] stated it clearly: "... we may say that an ESP course is purposeful and is aimed at the successful performance of occupational or educational roles. *It is based on a rigorous analysis of students' needs* and should be 'tailor-made.'"

This means that students' needs represent the most important factor in course design and override all the other considerations. Thus, "Tell me what you need English for and I will tell you what English you need" became the guiding principle proposed for ESP [Hutchinson and Waters 1987:8].

1.4.1 Defining Needs Analysis

The term needs may be used in the context of needs analysis to refer to wants, desires, demands, expectations, motivations, lacks, constraints, and requirements [Brindley 1984]. Brown [1995:36] defines needs analysis as:

the systematic collection and analysis of all subjective and objective information necessary to define and validate defensible curriculum purposes that satisfy the language learning requirements of students within the context of particular institutions that influence the learning and teaching situation.

Thus, needs analysis is the process of gathering and interpreting information on the uses of the target language that should be formulated as feasible goals or

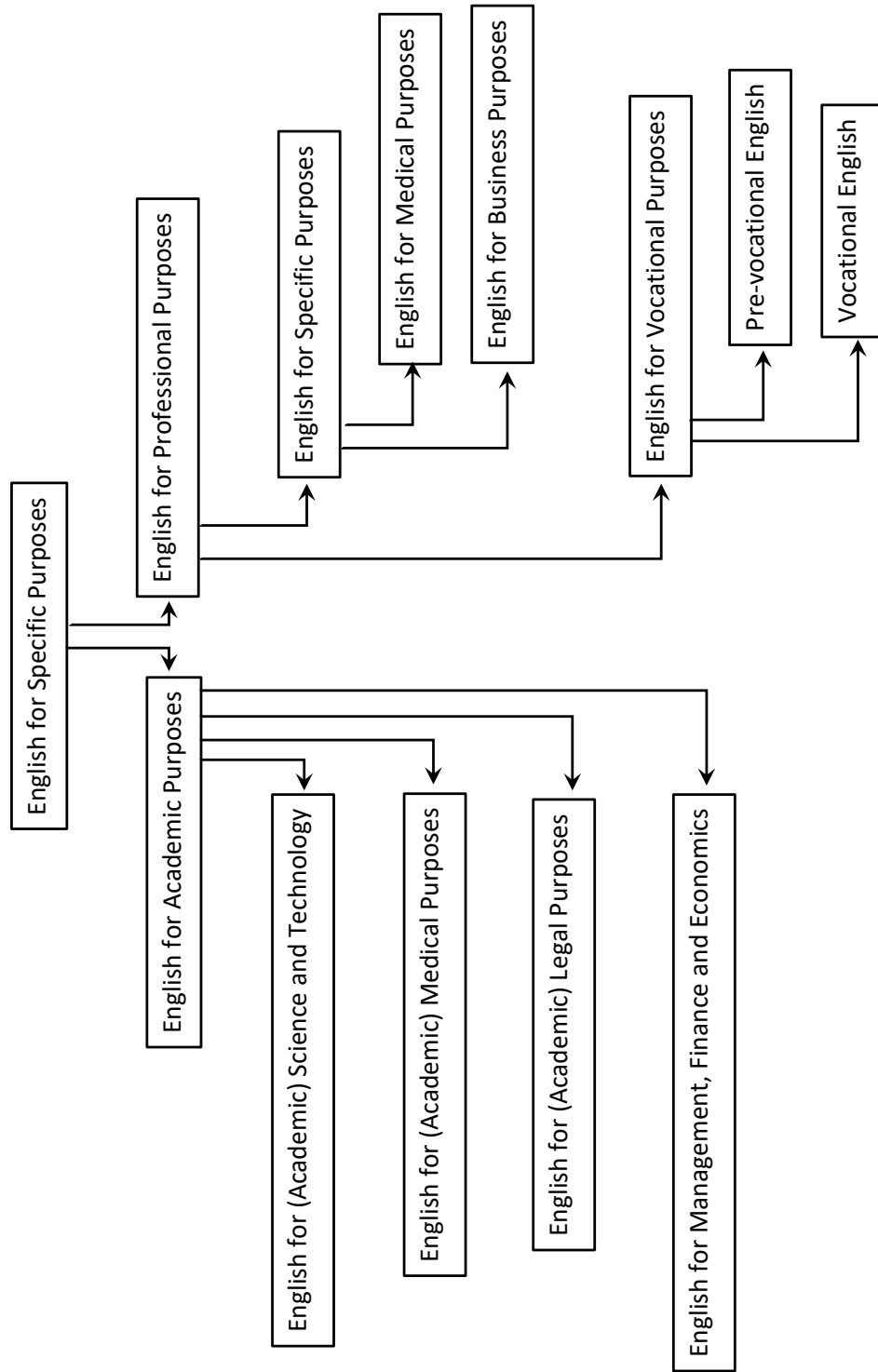


Figure 1.2: ESP Classification by Professional Area [Dudley-Evans and St John 1998:6]

objectives taking into consideration the learning environment. This goes well with Hutchinson and Water' distinction between target needs: 'what the learner needs to do in the target situation', and learning needs: 'what the learner needs to do in order to learn' [Hutchinson and Waters 1987].

1.4.2 Development of Needs Analysis

The concept of needs analysis took a prominent place in language learning during the 1970s in the context of the Council of Europe's Modern Languages Project [Trim et al. 1973]. This project was heavily influenced by philosophies of lifelong education which were based on the idea that instructional programmes would be more effective if they were centred on learners' individual needs and interests. From that time different approaches to needs analysis have been proposed.

A. Target Situation Analysis

A first model of needs analysis was proposed by Richterich [1972]. It was based on a set of categories for establishing learners' communicative requirements in the future context of language use. The model provides detailed information concerning the settings in which the learners would use the language, the people with whom they will communicate and the language exponents (notions and functions, syntax, lexis, etc.) they would need for communication. The obtained information is then used to determine the content and the objectives of the instruction programme. This type of needs analysis was known as Target Situation Analysis (TSA).

The most influential model of TSA was Munby's Communicative Needs Processor (CNP) [Munby 1978]; a complex and very detailed analytic tool that allowed course planners to build up a profile of the learner's communication needs. TSA was closely identified with ESP movement and Munby's CNP was for years the machinery that almost all ESP course designers based their work on, as reported in [Hutchinson and

Waters 1987:54]:

The work marked a watershed in the development of ESP. With the development of the CNP it seemed as if ESP had come of age. The machinery for identifying the needs of any group of learners had been provided: all [what] the course designers had to do was to operate it.

CNP investigates the particular communication needs according to socio-cultural and stylistic variables that interact to determine a profile of such needs. In this model, Munby includes eight essential parameters that determine both linguistic and non-linguistic data analysis: four independent parameters which serve the processing of non-linguistic data and four dependent parameters which serve the processing of linguistic data.

The four independent parameters, namely: purposive domain, setting, interaction and instrumentality, determine the four dependent ones, which are: dialect, communicative event, communicative key, and target level.

- (1) The purposive domain constraint establishes the type of ESP and the reason for which the target language will be used.
- (2) The setting variable includes the physical specification in terms of space and time of the situation where English will be used, besides psychosocial settings.
- (3) The Interaction variable identifies the learner's interlocutors and predicts the relationship between them.
- (4) Instrumentality: specifies the medium (written, spoken, or both), the mode (monologue, dialogue, etc.) and the channel of communication (face to face, distant, etc.).
- (5) The Dialect parameter specifies the dialects learners will have to understand or produce according to the setting, the purposive domain and interaction.

- (6) The Communicative event states what the participants will have to do productively or receptively according to the physical setting, the purposive domain and instrumentality.
- (7) The Communicative key is concerned with the manner in which the participants will do the activities in function of psychosocial setting, interaction and instrumentality.
- (8) The target level variable defines the aimed linguistic proficiency at the end of the ESP course for each skill.

The collected needs are then translated into a list of language skills and micro-functions which form the basis of the target syllabus specification. The CNP is at the heart of the needs analysis system that includes in addition the following elements:

- (1) the *participants*: personal and linguistic information about the learners;
- (2) the *profile of needs* which is established through the processing of data in the CNP;
- (3) the *meaning processor* that converts parts of the socio-culturally determined profile of communication needs into semantic subcategories of a predominantly pragmatic kind;
- (4) the *language skills selector* that identifies the specific language skills required to realise the events or activities identified in the CNP;
- (5) the *linguistic encoder* that considers the appropriateness to the context;
- (6) the *communicative competence specification* which is translated from the profile of needs.

B. Present Situation Analysis

The Present Situation Analysis (PSA) approach departs from the idea that the destination point could not be efficiently reached if reliable information about the current situation is lacking. Therefore, “a PSA estimates strengths and weaknesses in language, skills, learning experiences” [Dudley-Evans and St John 1998:124]. The term present situation analysis itself was first proposed by Richterich and Chancerel [1980]. PSA and TSA could be considered complementary to each other since none of them could stand alone for determining an effective syllabus that enables the learners attain their aims.

PSA collects information from the learners, the teaching institution, and the ‘user institution’, i.e. the institution where acquired linguistic competence will be utilised [Jordan 1997]. The aptitude tests are customarily accepted to be reliable means to check the learners’ initial level. In addition, background information that could be obtained directly from the learners – such as their level of education, previous language-related experience and self-estimation of their proficiency in language use – may to some extent predict their actual present abilities.

C. Pedagogical Needs Analysis

The term Pedagogical Needs Analysis (PNA) was first proposed by West [1997] to assemble useful information covering the ‘route’ from the present situation to the target situation. Within this approach, three kinds of study are found: deficiency analysis, strategy analysis or learning needs analysis, and means analysis [Songhori 2008].

- **Deficiency Analysis:** It is based on the assessment of the differences between the present learners’ abilities and what they are expected to master in the target situation. This is in close relationship with what Hutchinson and Waters [1987] called

lacks which “represent the gap between the target proficiency and what the learner knows already.” [Jordan 1997:26]

• **Strategy Analysis or Learning Needs Analysis:** The focus of needs analyses shifted in the 1980s toward the methodological aspect of implementing language programmes, i.e. from looking for ‘what people learn’ to ‘how people learn’. Thus, methods of learning that involve learners’ styles and strategies gained more attention [Jordan 1997].

In describing their ‘learning centred approach’, Hutchinson and Waters [1987:54] defined learning needs as “what the learner needs to do in order to learn”. They showed the importance of such information by drawing a parallel between the learning process and a journey:

It is naive to base a course design simply on the target objectives, just as it is naive to think that a journey can be planned solely in terms of the starting point and the destination. The needs, potential and constraints of the route (i.e. the learning situation) must also be taken into account, if we are going to have any useful analysis of learner needs. [Hutchinson and Waters 1987:61]

• **Means Analysis:** Local learning situations have a significant influence on the success of the course. Therefore, designers should adapt the course to the learning environmental constraints, such as cultural attitudes, resources, materials, equipment and methods. This approach has been called the ‘environmentally-sensitive teaching approach’ [Jordan 1997].

1.4.3 Critics of Needs Analysis in ESP/EST

In [Basturkmen 2006], some critics and issues concerning needs analysis and ESP are provided. We summarise them here, and we comment some of them regarding

their suitability to EST learners at Constantine 2 University – the subjects of our study.

- Needs analysis is too often based on the information that comes from the institutions themselves, who already have definite expectations about what the learners should be able to do. The institutions’ interests will thus be served often at the expense of [those of] the learners [Basturkmen 2006]. This particular issue is widely met with the Constantine 2 University EST learners. Although many theses that studied ESP/EST learners’ needs in the computing department¹ have been defended, there has been almost no serious exploitation of their findings.
- Language training for occupational purposes provides the learners with the sufficient English for specific jobs. But, the learners would face considerable difficulties when they move out of these jobs [Basturkmen 2006]. Today, after decades of this study, the situation has become worse, mainly because of the exponential growth in information and communication. Actually, social media is generating constantly changing occupational requirements. Thus, new approaches to EST course content design need much more than needs analysis.
- The learners may not be a very reliable source of information about their own needs, especially if they are relatively unfamiliar with the job they are to perform or with the subjects they are to study [Basturkmen 2006]. A factor that is contributing to this issue is largely the absence of almost any connection between the technical content of many university curricula and the future work environment. In simple words, a student who does not know much about his speciality-related needs is likely to ignore any future situations in which language would be used.

¹The department of computing is the old institution in which most of those studies took place. This department has been extended to become the ‘Faculty of New Technologies of Information and Communication (NTIC for short)’ since 2011.

- Learners may have additional needs that are not too related to their job or study. For example, engineering students may need to deal with written texts concerned with technical matters but may want to read topics in English on other general subjects. Consequently, using exclusively technical texts, topics, or tasks may turn out to be demotivating [Basturkmen 2006]. However, it is not an easy task to involve professionals in the design of courses, this is due to the scarceness of serious language planning actions.
- Language needs are not learning needs. Although learners will need to use certain language structures or features in their target environments, this does not mean that they are ready to acquire them [Hutchinson and Waters 1987]. The training should then include intermediate aspects that have not been expressed by the learners in order to make them able to deal with the aspects they need.
- Learners may lack awareness or knowledge about language that allows them to describe meaningfully their needs. The analysis will then be based on unreliable source of information [Basturkmen 2006]. This problem is a language-oriented one, unlike that related to the ignorance of future job-related situations.
- Language use in specific situations is simply too unpredictable to be identified in any certain terms. The adopted approaches in ESP produce sometimes a rigid view of language needs and do not always take account of the language use variation that exists in any target situation. In Munby's Communicative Needs Processor [Munby 1978] for example, the English language functions that would be needed are associated – in a rigid way – with the actual linguistic formula for their realisation.
- The different actors including the learners, the teachers, the pedagogical institution and the subject specialists may express too different and even conflicting needs. So, the needs analyst has to decide whose perspectives to take into consideration in designing ESP courses or to synthesise divergent perspectives.

- Basing the course design on needs analysis may lead to language training rather than language education. Learners are deprived of the generative basis of language and will only be trained to perform a restricted repertoire of the language as reported in [Widdowson 1983], who also noted that the learner may always go beyond the goals of the course of instruction. This special case is the source of what we call in the department *the ‘computer, mouse, keyboard’ problem*. Very basic texts have been dealt with as result of a very preliminary obsolete needs analysis, in which the course devisers set some preliminary materials mainly composed of basic and old computer-related concepts.
- It is claimed that needs analysis is a neutral process, but some institutions may use outsider participants to match its established practices [Basturkmen 2006]. The decision to involve professionals is a tough one, because the professional is not likely to know much about the language as stated above; on the other hand, the ESP/EST practitioner has not big knowledge about *many* future situations in which language would be used. For this specific reason, the ESP/EST professional needs to be a researcher in the field of future practice of language.
- Needs analyses are not theoretically neutral and different needs analysts may consider differently the collected data because “Any system of needs analysis is related to the theory of the nature of language” [West 1994:2].

1.5 EST vs ESP: From an Originator to a Sub-category Position

According to Halliday [1993] (cited in [Paltridge 2012]), a text is recognised as scientific English if it is the result of “the combined effect of clusters of features and, importantly, the relations of these features throughout a text”. Nowadays, English for Science and Technology (EST) is mostly treated as a separate variety of ESP. However, the relationship between these two branches of ELT is more than a simple super-type/subtype link. Actually, for many years, EST has been the focus of

ESP practitioners, the very first researches have had *science* and *technology* texts as essential material of their study. Further, Hutchinson and Waters [1987:16-17] themselves admit that the branches of the ELT tree, seen in Figure 1.1, are not strictly separated.

Parkinson [2012] argues that “because of the rapid expansion of English for science and technology (EST) in the last 50 years, science and technology were an early focus for ESP researchers”. He cites as examples of such researches: [Barber 1988; Bazerman 1984, 1988; Braine 1988; Halliday 1993; Herbert 1965; Swales 1971, 1988]. He adds:

The initial interest of EST teachers and researchers was on linguistic forms [...], with later emphasis on skills, a more recent focus has been on disciplinary socialization, and most recently a critical perspective, which considers how literacy practices express societal or disciplinary power differences [Paltridge 2012:155].

Similarly, Kennedy and Bolitho [1990] (as cited in [Čižinauskienė and Poškienė 2001]) state that:

Much of the demand for ESP has come from scientists and technologists who need to learn English for a number of purposes connected with their specialisations. It is natural, therefore, that English for Science and Technology (EST) should be an important aspect of ESP programmes.

In the following paragraphs, this idea of EST being the origin to ESP is discussed, and some EST-oriented works are presented with more detail.

As stated above, the very early works of ESP were revolved around texts from science and technology. The focus was EST in academic contexts, “an interest that remains strong to this day”, as stated by Paltridge [2012:7]. The nature of research in the first publications about EST was based on descriptive statistics. For instance, the work of Barber [1988] – originated in 1962 and taken as example by Swales

Episodes [Swales 1971] – was devoted to counting grammatical features across genres (textbooks and journal articles), in an attempt to determine some general sentence-level characteristics of EST. This work, among others, “had descriptive validity but little explanatory force” [Swales 1971:59] (cited in [Paltridge 2012:7]).

This limit, stated by Swales, combined with the work of influential EST researchers – like John Lackstrom, Larry Selinker, and Louis P. Trimble – were the main reason for which statistics-based EST works have been overridden. The latter authors founded to a new era in EST; based on the analysis of the rhetorical purposes and how these may influence the choice of lexis and grammar [Lackstrom et al. 1988]. In simple words, the rhetorical purpose of an author is the main influencer on his grammatical and lexical choices. The focus on the rhetorical function of language is still fuelling many ESP/EST discourse analysis [Paltridge 2012]. Thus, the attention shifted to understanding the way sentences were combined in discourse to produce meaning. The organisational patterns and the specific means by which they are signalled were specified. The identified patterns would then form the ESP syllabus [Hutchinson and Waters 1987:11].

With the help of other EST practitioners, Trimble [1985] exploited the findings of discourse analysis to set forth the ideas and practices of what he defines as a ‘rhetorical approach’:

The rhetorical approach to teaching non-native speakers how to read (and secondarily how to write) scientific and technical English discourse is built around three main rhetorical concepts: (1) the nature of the EST paragraph; (2) the rhetorical techniques most commonly used in written EST discourse; and (3) the rhetorical functions most frequently found in written EST discourse [Trimble 1985:14], cited in [Paltridge 2012].

In the 1980s, many works were interested in ‘linguistic devices’ and how they are linked to ‘rhetorical purposes’ in ESP. Again, we find that leading works have focused

on either science or technology. For instance, Adams-Smith [1984] considered medical discourse to study the L2 speakers' problems in distinguishing between objective statements of fact and author-marked observations in written texts [Paltridge 2012]. For his part, Malcolm [1987] tried to find out the rules governing tense usage in scientific articles. Biology, chemistry and physics discourses have been considered by Hanania and Akhtar [1985] to study the rhetorical functions of certain verb forms. "Rounds [1987] took on spoken English in her study of the rhetorical realizations of personal pronouns in a university mathematics classroom" [Paltridge 2012:10], thus another EST-centred ESP research.

The collection edited by Trimble et al. [1978] is another pioneering work of ESP that was based on science and technology materials. There were some specific sections on the discourse analysis of EST features in different languages: Spanish, Macedonian, and Japanese. The adopted approach was mainly based on contrastive analysis. Tarantino [1988] targeted EST in the context of the Italian language. The work investigated the macro- and micro-level needs of EST researchers. Braine [1988] focused on the academic context of EST, he analysed the students' writing assignments in two undergraduate courses in science and technology. An important aspect that is seen here and in many other researches is that the EST variety of ESP has been very correlated to the context of academia, even if no one denies that EST has a strong link to not only professional contexts, but also to industry. This idea is mentioned by Paltridge, who states that:

It should be pointed out, however, that despite the varied topics mentioned . . . , much of ESP research continued to operate within a narrow topical range, as the principal interest of researchers often focussed on English for academic purposes, particularly science and technology (EST) at the post-secondary or graduate level. [Paltridge 2012:12]

The doctoral thesis of Hirvela [1993] gives an interesting finding which is: EST

courses should not be totally disconnected from the humanistic nature of language. In simple words, if students were exposed to some literary texts, this would help them to deal with the scientific ones. The author “focussed on the use of literary texts (science fiction short stories) with undergraduate EST students in Hong Kong and reported positive transfer from their specialised literary reading to their science-based writing, leading him to propose a Literature for specific purposes framework for ESP” [Paltridge 2012]. The author extended this study in [Hirvela 2001] to deal with more academic contexts at an American university.

The above-mentioned works are not an exhaustive list of all EST works that contributed to the prosperity of ESP. They have been given here just as illustrative research that proves that:

- EST had been the first variety of research into ESP, before the latter was defined as a fully-fledged domain of ELT research and practice.
- The terms/concepts: ESP and EST are being used interchangeably in the literature.

1.6 EST/ESP in Algerian Universities

In a way similar to what happened at the beginning of EST/ESP evolution, the ESP area of practice has also begun with some EST-centred practice. “It dates back to the early 1970’s when a course called EST (English for Science and Technology, as it was originally known) was introduced in the curriculum of the ‘licence’ training” [Segueni 2012]. The initiation of students to scientific and technological writings was the main objective of the course. In parallel, the ESP emerged as a new way to teach English for foreign specialists who had to deal with very specific areas of language use.

Algerian universities started so giving more and more attention to ESP/EST

practice and research. Though, as Segueni [2012:24] states, “for unknown reason[s] this particular subject disappeared completely from the curriculum”. Later on, in the 2000s, the implementation of the LMD system brought to the fore an ESP course in most English studies curricular offered by Algerian universities.

Conclusion

In this chapter, a brief description of English for specific purposes was presented. EST as a variety and originator of ESP has also been discussed. We have given in the chapter more importance to show how the latter approach to language teaching started and has been explored in recent years. Two main aspects of EST/ESP have been studied: the specificity of purpose on the one hand, and the communicative function of language on the other hand. The next chapter is a theoretical exploration of the use of two linguistic notions, namely ‘the mother tongue’ and ‘translation’, in the ELT classrooms.

The Mother Tongue and Translation in the ELT Classroom: From a Taboo To a Pedagogical Tool

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Introduction

The controversy about whether the Mother Tongue (MT/L1) or translation should be allowed or banned from the Foreign Language (FL) classroom consumed a

lot of research effort in the second half of the twentieth century, and it is still there. To put our contributions into the bigger picture, the present chapter explores the possibilities offered by the use of L1 or translation in the EFL classroom. As far as the works that investigated the role of L1/translation in the specific case of ESP/EST, we dedicated a separate section to discuss them in Chapter 5 of this manuscript¹.

This chapter starts by summarising the theory behind the use of the MT in the FLT/EFL classroom, it then presents the state-of-the-art works in that perspective. Next, it studies the usability of translation for FLT/EFL; the pros and cons of translation use are also given.

2.1 Setting the Scene: Is it L1, L2 or Translation?

There has been a lot of overlap between the studies about the use of translation and those that studied the role of the MT in the EFL classroom. This may be justified by the fact that when translation occurs, it is mainly from the FL into the mother tongue, and vice versa. However, one should be careful that there are some cases in which the translation takes place from the FL into any other language the learners understand better than the FL. For instance, the subjects we targeted in this study – EST learners in the NTIC Faculty, Constantine 2 University – generally have no big issues with French; compared to English. So, the teacher is likely to use translation into French whenever difficulty is met to help students comprehend the presented material. The students also tend to use French, rather than Arabic (the MT), in this context.

¹The critical analysis of these works and their discussion with respect to the EST learning context at the NTIC Faculty, of Constantine 2 University, could be seen as a secondary contribution. Thus, we preferred to put it in a separate chapter.

2.1.1 Translation

To ‘translate’ means to transfer a source language text into a corresponding target language text [Ghazala 1995:22]. Hence, when translating, two languages are involved: the source language (SL) and the target language (TL). According to Foster [1958], translation is an act through which the content of a text is transferred from the SL to the TL. So, the translator needs to have good knowledge of both source and target language in addition to a high linguistic sensitivity while transmitting the writer’s intentions, thoughts and opinions in the translated version with the maximum degree of faithfulness and precision [ibid:53]. Catford [1965:20] defines translation as the “replacement of textual material in one language (SL) by equivalent textual material in another language”. He adds that translation is the process of replacing a message or a statement in one language (SL) by the same message or statement in another language (TL).

Generally speaking, the term ‘translation’ embodies two complementary parts: *the product* and *the process*. Translation can be defined as a product because it provides us with others’ cultures, customs and traditions in addition to ancient societies’ civilizations [Yowell and Lataiwish 2000]. It can also be seen as all the set of processes and methods used to convey the meaning from the source language to the target language [Ghazala 1995:1]. This view focuses on the notion of meaning as an essential element in translation. Understanding the meaning of the source text is, so, vital to have the appropriate equivalent in the target text. Hence, it is the meaning that is translated in relation to grammar, vocabulary, style and phonology [ibid: 22].

2.1.2 The Mother Tongue

The terms ‘Mother Tongue (MT)’, ‘first language’ (L1) and ‘native language/tongue’ are essentially all equivalent, though there are some cases when they mean different

things. The MT is the native language that a person has learned from birth. Linguistically speaking, the mother tongue is the language spoken by the care-takers thus, this language is the primary language of the child [Rommel and Tonell 2017].

2.1.3 Foreign/Target Language

In the context of this study, the terms Target Language (TL) and Foreign Language (FL) are used interchangeably. In fact, the Meriam-Webster dictionary defines the target language as either ‘a language into which another language is to be translated’ or ‘a language other than one’s native language that is being learned’. The latter definition is the same as that of Foreign Language.

2.2 Using the Mother Tongue in the EFL Classroom

The literature of EFL teaching/learning is full of research works that have analysed and discussed the impact of using the MT on learners’ language learning. We start this section by presenting the arguments against its use, then we move to detailing the views of those supporting its use.

2.2.1 The Arguments against the Mother Tongue’s Use in EFL Classrooms

The opponents of the MT use generally belong to the Communicative Language Teaching (CLT) doctrines [Hymes 1972]. “This acquisition-focused approach sees communicative competence progressing through three stages: aural comprehension, early speech production, and speech activities, all fostering ‘natural’ language acquisition, much as a child would learn his/her native tongue.” [Rommel and Tonell 2017]

Holthouse [2006] reports that “By the 1970s, CLT theorists had thoroughly popularised the idea that using the MT in the classroom is counter-productive”. The

main argument has always been that the more a foreign language learner is exposed to that language, the better his proficiency at that language will be. Thus, the MT ban would help in offering more exposure to the TL. Krashen [1981], in particular was influential in this area. As cited in [Holthouse 2006], he claimed that:

‘learning’ (as opposed to acquisition) is not especially helpful, and stressed instead the need for learners to be exposed to as much spoken English ‘input’ as possible. He suggested that, with sufficient amounts of input, L2 skills would be acquired (more or less by a process of osmosis) through the mysterious ‘affective filter’ [Holthouse 2006:28].

Likewise, Chaudron [1988] promotes a “rich TL environment”. Willis [1981], (cited in [Sharma 2006:80]), argues for a ‘teaching English through English’ approach in which he encourages “speaking and using English in the classroom as often as [one] possibly can.” Ellis [1984] also warns against “depriv(ing) learners of valuable input in the L2” [Wharton 2007].

Auerbach [1993] supports and explains the same idea by saying that “the more students are exposed to English, the more quickly they will learn; as they hear and use English, they will internalize it to begin to think in English; the only way they will learn it is if they are forced to use it.” Five reasons for using only English in the EFL classroom were given by Philipson [1992:185]:

- (1) English is the best taught mono-lingual;
- (2) The ideal teacher of English is a native speaker;
- (3) The earlier English is taught, the better the result;
- (4) The more English is taught, the better the result.
- (5) If other languages are used too much, standards of English will drop.

The ‘no return point’ or the over-open view towards the use of the MT is the

argument given by some linguists, who think that this “may lead to an overuse and inadvisable use of it by teachers” [Ellis 1985].

2.2.2 The Arguments Supporting the Mother Tongue’s Use in EFL Classrooms

After we have seen some of the arguments belonging to the doctrine that prohibited the use of the MT in the TL teaching, we present in the rest of this section the arguments of the proponents of the MT use in the TL classroom. In his paper ‘The mother tongue and English language teaching’, Carver [1983] proposed some potential benefits of using the mother tongue in ELF teaching. Not only the pros of the MT use he gives are well presented, but we have also found that most of them, in similar or other forms, have been given in many solid founding works. Carver [1983] argues that the use of the MT would be of great help if it is used in the following contexts:

- (a) Using the MT **to give a ‘translation equivalent’** helps the teacher to economise the session time: Trying to explain, contextualise or mime the meaning of a given word may be time consuming [Carver 1983]. Atkinson [1987] supports this use by stating that this is usually preferred for techniques such as ‘eliciting language’, ‘checking comprehension’, ‘memorising new vocabulary’ or ‘discourse teaching’. Instead of dealing with time-consuming ‘inductive’ teaching techniques, many teachers resort to translation, as it is more direct and timesaving although it is not necessarily better [Balabakgil and Mede 2016].

In [Liu 2008], the author experimentally proved that L1 facilitated the memorisation of new words by adult learners. He argues, in his article, that adult learners have a well-developed system of concepts and lexis, which means that their L1 will have an active role in their L2 learning.

- (b) Using the MT **to explain the rules** adopted by the teacher to accomplish the learning task would give better results, mainly because the MT is better

understood than the TL. The same idea is proposed by Atkinson [1987:243], who recommends using students' L1 to discuss classroom methodology particularly at lower levels, because "students have a right to know what they are doing in the classroom and why they are doing it." [Balabakgil and Mede 2016]

- (c) **To avoid interference**, more precisely negative interference, from the MT; the latter language would be beneficial to make 'explicit comparisons' between the MT and the TL. "When learners do not know how to say what they want, they are bound to fall back on the mother tongue, and to use incorrect expressions which are based on the mother tongue." [Carver 1983:88] This view was also supported by other scholars such as detailed in [Selinker 1972], [Corder 1978] and [Ellis 1999].

Translation to L1 has also been thought to involve some cognitive benefits to the foreign language learners. One of these benefits, as Grant [1993] (cited in [Balabakgil and Mede 2016:19]) argues, is that "translation forces learners to think about the meaning and social appropriacy by allowing them to think comparatively. When they do so, they become more aware of the similarities and differences between [the] two languages and reduce the risk of making typical interference mistakes".

- (d) The mother tongue may also be used **to prepare adult learners for written composition**. This is done by allowing the learner to express what (s)he wants to put in her/his composition using the MT, then the teacher helps her/him by providing the English equivalents of what the learner finds difficult to express.
- (e) The MT may be used **to convey the meaning of language** before practice. This is specifically of help in dealing with structural-situational lessons.
- (f) Another aspect for which the MT may be of help is **to present a text for reading**. The purpose here is to simplify the reading process for beginners. Using bilingual texts is one way to implement this idea.
- (g) The MT may also be used **to assure a gradual approximation to reading**.

The procedure consists of presenting the studied material through many levels with decreasing the amount of use of the MT from a level to the next. This approach was also proposed by Burlings [1968]. He called it an ‘outlandish proposal’. The role of the mother tongue is not only to help in understanding the studied material, but also to increase the learners’ self-confidence. If no sudden break with the MT is made, the learners will always feel secured, which would result in their implication in the text.

- (h) **Prompts in dialogues** is a quite used model for ELT. In this model, the dialogue is treated as follows. “The language for A is given and the learner takes the part of B; ideas for B are given, in the L1.” [Carver 1983:90] This would help the learner to be productive; he would be able to focus on language because the ideas are given in his MT, which means that they will be very well understood.
- (i) **‘Intercambio’** is claimed to work good for mixed classes. In this technique, the learners of the foreign language are paired with natives of the foreign language. This approach is mainly based on the communicative approach. Thus, the ‘free, uncontrolled use of the language by the learners’ would help in permitting the learners an early implication in language use. Organising opportunities by replacing the native speakers by the teacher of advanced learners is a possible adaptation of the intercambio approach, to make it possible to be used in a normal classroom.
- (j) **Language switching** that makes use of the MT should not be banned. “The idea is that when a learner has to say something, (s)he is allowed to switch into the mother tongue if (s)he does not know how to say it in the target language”. This helps to keep going the language production operation, which is very important in language learning.
- (k) The mother tongue can play a useful part in **testing knowledge** of a foreign language [Matthews-Bfevsky 1972].

What is well seen from the just-presented arguments is that they are, as stated by Carver [1983] himself, based on:

fairly obvious assumptions, e.g. that the mother tongue is not banned by the authorities, that the teacher understands the mother tongue, that only one mother tongue is present in the classroom (or that the teacher is not dealing with the whole class, but with a group), that the learners are literate in the mother tongue, etc. [Carver 1983:88]

Even if Carver [1983] argues for allowing the use of the MT in the EFL classroom, he makes it clear that its use should be kept to a minimum. He adds that his ideas should not be seen as support to the Grammar Translation Method (GTM) that he considers ‘indefensible’ [ibid:92].

Dujmović [2007] points out that excluding the learners’ mother tongue for the sake of maximising their exposure to the target language is not necessarily beneficial. He argues that depriving students of L1 means not allowing any room for their self-expression. Balabakgil and Mede [2016:17] comment on that by stating that “it is a natural phenomenon for a language learner to equate what he is learning with his L1; and thus ignoring this need would only lead to negative consequences which may even interfere with their learning”.

Similarly Butzkamm [2003:36] claims that L1 use provides the learners with a sense of security and allows them to be stress-free, and thus prevents the feeling-frustration situations. He adds that “all newly acquired foreign language items have to sink roots in the learner’s mind, which are eventually deep enough for the items to function independently of the L1”. A relatively extreme view of this issue is that of Auerbach [1993] who believes that “forcing people to use only L2 violates human rights as it means to impose ideological control on them. In other words, forcing people to use the TL may aim to break one’s ties with his or her native language and culture or identity.” [Balabakgil and Mede 2016:19]

This identity-centred argument has also been reported by Cook [2007], she criticised the monolingual approach by stating that the MT is a part of the learner's culture; thus, "neglecting learners' L1 in the classroom also means neglecting learners' culture, which might lead to the danger of rejecting their identity.", she adds. Balabakgil and Mede [2016:19] support these ideas when stating that "disregarding students' mother tongue can be de-motivating and [can] make them less enthusiastic to learn the target language". Similarly, Levine [2003] studied the anxiety of university students and how it is influenced by the amount of use of the MT. He found that the more the MT is allowed, the less anxiety is.

Harbord [1992] argues that "even if most language teachers have tried to create monolingual classrooms, they have found they have failed to get the meaning across, which led to *student confusion and indignation*. Translation is a natural phenomenon and an inevitable step of second language acquisition." He adds that "it [is] highly unlikely that a teacher would refuse to answer a question like *What does . . . mean in English?*" [Balabakgil and Mede 2016].

Macaro [2005] agrees and goes even further by claiming that "most scholars now admit that even the most advanced language learners inevitably resort to their own mother tongue to process language and they believe that there is recognizable value in L1 to enhance learning at certain times." Balabakgil and Mede [2016] confirm this and give some reasons of the use of L1 in the EFL classroom by saying that:

Most teachers now admit that they use L1 in English classrooms for a number of reasons such as clarifying meaning of difficult words, explaining complex grammar rules, discussing cross-cultural issues or establishing close relationship with their students. Apart from that, most teachers agree that their students learn English more effectively; they feel easy and comfortable through the use of L1. [Balabakgil and Mede 2016:17]

Cook [2010:155], from the same perspective, states that:

Humans teach and learn by moving from the familiar to the unfamiliar, by building new knowledge onto existing knowledge. Language learning and teaching are no exception to this general rule. Translation is just such a bridge between the familiar and the unfamiliar, the known and the unknown. To burn that bridge or to pretend that it does not exist, hinders rather than helps the difficult transition which is the aim of language teaching and learning.

She also distinguished between three versions of L1 rejection:

- “At its strongest, it is ‘Ban the L1 from the classroom.’ ... ‘Only in circumstances where the teacher does not speak the students’ L1 or the students have different L1s could this be achieved”
- “At weakest, the rule is ‘Minimize the L1 in the classroom,’ that is to say, use it as little as possible”
- “A more optimistic version is ‘Maximize the L2 in the classroom,’ emphasizing the usefulness of the L2 rather than the harm of the first”.

Most EFL classrooms are monolingual. This leads to the following facts, as Atkinson [1993] in his book ‘Teaching monolingual classes’ states:

- There are common language and culture shared by the learners.
- These classes are in countries where English is neither an official nor a main language.
- The teachers also share the common language and culture as the learners.

In such contexts, it would be good to encourage the learners to take every opportunity to practice English and try to expose them to English as much as possible. Though, this does not imply that the teachers have to adopt an English-only approach [Atkinson 1993; Balabakgil and Mede 2016]. In his preface to the Atkinson’s

book, Grant goes further to encourage teachers to get the maximum benefit from the MT as a ‘teaching tool’ because, he argues, “they are the ones who know how L1 can be incorporated as a teaching strategy in L2 classrooms effectively.” [Balabakgil and Mede 2016]

The ‘Schema Theory’ states that cognitive knowledge is grouped into interrelated patterns [Nunan 1999]. Based on this theory, Lightbown and Spada [2013] report that the knowledge of L1 may be used to analyse the TL. The ‘Interlanguage Theory’, on the other hand, tells and interprets how the brain functions and makes connections between L1 and L2 along with how L1 can influence linguistic and cognitive interpretations in L2. This strong relationship between the MT and the TL intrigued FLT researchers to reconsider the important role the MT in TL learning [Ellis 2005].

Wharton [2007] points out a further dimension about language: the L1 may be used to focus on language. According to him, L1 translation provides a “clearer, shorter and more direct explanations compared to other methods.” Lightbown and Spada [2013] explain this idea:

This is a deductive approach to teaching grammar that many low-level learners want and many non-native speaker teachers provide in language classroom[s]. This technique, which is peculiar to the grammar translation method, goes far beyond providing the equivalent of a word or the word-for-word translation of an expression. Instead, specific points about grammar usages are explained and exemplified in detail. Although EFL teachers underrate this technique because it ignores the context-meaning relationship, it can be a very useful way to raise learner consciousness.

Atkinson [1987:244] exposes the same idea by stating that ‘using L1 for translation’ and ‘presentation and reinforcement of language’ helps early level learners to focus on accuracy and notice the key structural differences between the two languages.

Balabakgil and Mede [2016:18] agree and propose that “By using L1 for this purpose, the teacher can clarify the complex grammar points and linguistic features more rapidly and allow more L2 practice to take place in the classroom.”

Classroom interaction is another potential beneficial use of the MT. According to Wharton [2007], there are many ways the teachers or the students can make use of L1 as an interaction tool in the classroom. In Atkinson [1987] words:

classroom interaction does not always mean the interaction between the teachers and students; it can also be the interaction among students when they communicate with one another to compare their answers, to explain grammatical structures, to comment, to give feedback or to evaluate each other’s performance in the classroom.

Lameta-Tufuga [1994] investigated the effects of allowing students some time to discuss the task in their L1 before they carried it out in the target language. They were given the opportunity to comprehend the content of the task through the use of their L1 before they started doing it. His findings showed that the learners were all actively engaged in the task and they came up with various ideas as they took advantage of their mother tongue for enhancing communication in the TL. Moreover, their pre-task L1 discussions included a lot of TL vocabulary that would be used later in the task. This supports the idea that L1 has a useful role in helping learners gain the knowledge they need to reach a higher level of TL performance.

After we have discussed in this section the use of the MT in the EFL classroom and presented the cons and especially the pros, we move in the next section to investigate the use of translation for EFL teaching. Basically, translation could be used in the EFL classroom either as an activity of just for helping the learners comprehend the conveyed message of the instructor.

2.3 Translation for General Foreign/English Language Teaching

The controversy about the use of translation in EFL goes back to the half of the twentieth century [Lo 2016]. The opponents believed that translation is to be discarded from the TL classroom mainly for being ineffective, unhelpful, unnatural, and even counterproductive [Bloomfield 1961; Hartmann and Stock 1964; Lado 1964; Huebener 1965; Gatenby 1967; Newson 1998]. Contrarily, many researchers have been convinced that translation has a positive role in the EFL classroom [Baynham 1983; Danchev 1983; Perkins 1985; Titford 1985; Atkinson 1987; Tudor 1987; Duff 1989; Husain 1994; Fraser 1996; Cook 1998].

2.3.1 The Arguments Against Translation Use in Foreign Language Classrooms

As a matter of fact, many of opponents of translation use in TL classrooms provide arguments very similar to those offered against the use of the MT. Since we have introduced many of these arguments above, this section could be seen as an enrichment from a translation-oriented perspective.

Because of its bad reputation, the classical Grammar Translation Method (GTM), that had been the main method to language teaching during more than two centuries, has led to a widely recurrent misconception about the impact of translation use in TL classrooms on the overall learning process [Malmkjær1998 1998; Lo 2016]. Zojer [2009:32] also says that “the greatest damage done to the reputation of translation as a language teaching tool was probably inflicted by the Grammar-Translation Method”. Another disadvantage of the GTM is that it “requires students learn grammar rules by rote and translating grammar drills composed of isolated sentences”, as Lo [2016] states. The chief cause of the GTM limitation is claimed by Catford [1965] to be the bad choices done; and not translation itself:

The chief defect of the now almost universally condemned ‘Grammar-Translation Method’ was that it used bad grammar and bad translation[;] translation is not a dangerous technique in itself provided its nature is understood, and its use is carefully controlled.

Other authors [Zojer 2009; Leonardi 2011] cite that another issue with the GTM is that it focuses on language rather than speaking and listening skills. The growth of the ‘Direct Method’ and the ‘Audiolingual Method’, that gave the ultimate importance to the TL, was another factor that translation and the MT have been excluded from the EFL classroom. “The negative attitude towards translation is mostly derived from the negative view of the Grammar-Translation Method, but hardly anyone who supports pedagogical translation in recent literature refers to this way of using translation.” [Lo 2016:42]

The opponents of using translation in the TL classroom also argue that translation is unnatural and inefficient [Lado 1964; Gatenby 1967]. The reason behind such consideration is that, as Lado [1964] explains, bilinguals do not translate they simply learn the languages naturally. The unnatural feature of translation for EFL, according to Gatenby [1967] comes from believing that it is a waste of time:

Why use two languages when the time allocated for learning is so short? Translation is a deceptive process in that, being laborious, it persuades teacher and pupil that a great deal has been accomplished. Unfortunately, such work is all but useless. Translation may give meaning, but it does not teach. It perpetuates the time-wasting habit of always associating the new language with the old [...].

In the same line of thoughts, Newson [1998:63] argues that translation is an ineffective approach that “deprives teacher and learner of the opportunity to benefit from the accruing advantages of working within one language” (cited in [Lo 2016:33]).

Avoiding L1 negative interference is another reason widely used by researchers to justify their recommendation of excluding translation from the EFL classroom. This claim is mainly based on adopting the Communicative Language Teaching (CTL) approach that, in which the communicative competence is emphasised [Terrell 1977; Asher 1981; Krashen 1981; Faerch and Kasper 1983; Ellis 1988; Chaudron 1988; Ellis 1988]. In the same context, Lado [1964:54], as cited in [Lado 1964], “cautions that translation may lead students to produce incorrect language constructions”. The increase in the amount of translation exercises and scarcity of appropriate intake is the reason for which Krashen [1981] recommends avoiding translation. Carreres [2006] states it clearly that “Translation into [the TL] is counterproductive in that it forces learners to view the foreign language always through the prism of their mother tongue”

A third argument on which translation was discarded from the EFL classroom is that the TL learners are likely to think that the two languages, SL (generally MT/L1) and TL, have a total equivalence. Lado [1964:54] states that translation may give students the false impression that the two languages have absolute equivalent expressions. Newson [1998:64] agrees, he thinks that “learners who adopt translation for second/foreign language learning may develop the false impression that ‘there is such a thing as simple word-to-word equivalence between languages’ ” [Lo 2016].

Another reason behind defending against the use of translation in the EFL classroom is that it is considered as a fifth skill, totally unrelated to the other four skills – reading, writing, speaking and listening [Weller 1989; Malmkjær 1998; Zojer 2009]. Furthermore, it is claimed to be more complex than the four other skills. That was the basis of Lado’s argument to caution about using translation in the EFL classroom. Newson [1998:63], in a similar way, states that “translation has no part to play in the four skills ‘which define language competence.’ ” [Lo 2016]

One other, apparently, obvious reason for teachers to avoid translation in TL

classrooms is the constraint of time. In fact, many practitioners claim that the session time should be dedicated to English in order to increase the learners' opportunities to practice speaking and writing it. Additionally, in the context of EFL, the teacher may be the only genuine source of language the learners have [Lo 2016]. Carreres [2006:6] argues for the opposite idea claiming that translation is a realistic method for the TL learning; he says: "it is naïve and simply inaccurate to imagine that learners who only have one or two contact hours of second/foreign language teaching per week can learn a language by immersion in the same way as children learn their mother tongue?" (cited in [Lo 2016:14])

Another argument against the use of translation in the EFL classroom is that many researchers state that not every type of students may benefit from translation activities. For instance, Carreres [2006:5] argues that "translation is a method that may well work with literary-oriented learners who enjoy probing the intricacies of grammar and lexis, but it is unsuited to the average learner". In fact most works arguing for translation use for EFL teaching were implemented in tertiary levels with adult learners and mostly with average to advanced learners [Sewell 2004; Källkvist 2004, 2008, 2013b] who "have good communicative competence in their [TL]". However, this argument has been rejected by recent authors, among them is Lo [2016:22] who states that "translation plays a facilitative role in engendering classroom discussions and can serve as a useful language learning activity" concluding so that "the use of translation activities should not only be limited to a certain group of students".

2.3.2 The Arguments for the the Use of Translation in the Foreign Language Classrooms

Malmkjær1998 [1998:6] claims that the degree to which the arguments against translation use in EFL classrooms are true depends radically on the kind of 'translation' experience students are exposed to. Moreover, the role the MT plays in the EFL, as seen above, translation has gained interest from the research community. The

arguments of the proponents are also solid. We give in the following some of them.

Some researchers have gone further by considering translation as a helpful *pedagogical* tool, they claim that it permits to learners to “systematize and enhance their linguistic knowledge through comparison between their native and target languages.” [Lo 2016] The results of the survey conducted by Pym et al. [2013] confirmed this by stating that translation tasks are being employed at various education levels, particularly at higher education. Lo [2016:16] also reports that “[m]ore and more scholars now believe that translation should not be deliberately excluded from [TL] classrooms and advocate the use of translation as a language learning activity”. He adds that: “many language activities can be presented as translation tasks for teaching purpose and a variety of translation tasks designed together with some form of treatment/training to help L2 learners make progress have been proposed in a number of publications.” [Lo 2016:19]

Krings (1987) (cited in [Ayachia 2018:64]) asserts that:

The frequent claim that free foreign-language text production must always have priority because it leads the learner to a more ‘idiomatic’ use of the foreign language is on no account correct. Or to put it even more clearly: to my mind, the investigation of foreign-language writing processes supplies no argument against translating into the foreign language. Writing and translating do not seem to be real alternatives

Gile [1995] makes a clear distinction between *professional* translation and *school* translation. He explains that the former focuses on the content, while the latter type concentrate on language. Klaudy [2003] also defines two types of translation: *real* translation and *pedagogical* translation. According to her, the goal of real translation is the translated text and it aims at providing information to real-world readers whose language is the TL.

On the other hand, the translated text is a tool for ameliorating the learners’

TL proficiency level. Stewart [2008], from his stand, stresses another important point concerning the pedagogical role of translation in an EFL classroom, he reports that “pedagogical translation can of course be either from native to foreign language or from foreign to native language – there is no reason why translation as an aid to language learning should not be bidirectional.” Newmark [1981], cited in [Lo 2016], acknowledges the helpfulness of L1-L2 translation when it is used pedagogically, suggesting that “brief translations from native to foreign languages are useful for the consolidation and testing of spoken and written utterances”.

Many researches argued for the positive effect of ‘conscious learning’ on adults’ TL learning [Yalden 1975; Bialystok 1981; Ellis 1985; McLaughlin 1987; Wenden and Rubin 1987; Schmidt 1990; Tarvin and Al-Arishi 1991]. Translation helps in this respect because it is a form of conscious learning [Lado 1964].

Boosting the students ability to communication, during classes, is another aspect translation may help in. Works like [Danan 2010; Källkvist 2013b,a] claimed that translation could be adopted to foster in-class communication and helps to offer a context in which student-initiated discussions would take place. Källkvist [2013b,a] for instance stressed the pedagogical value of translation in a the FL classroom.

It is worth to mention here that almost all those who defended the benefits of translation as a pedagogical tool in for FLT did not implement a fully established procedure to include it in the syllable. Lo [2016:20] confirms this idea when stating that “one major limitation [of these works] is that the tasks adopted in [them] do not resemble professional translation and simply involve sentence-level translation.”

Schäffner [1998] cites more benefits of using translation in EFL classrooms; he argues that translation:

- improve verbal agility,
- expand the students’ vocabulary in L2,

- develop their style,
- improve their understanding of how languages work
- consolidate L2 structures for active use, and
- monitor and improve the comprehension of L2.

In the rest of this section, some of the arguments given in the opponents works are discussed. What is more is that, as stated by Danchev [1983], “many of the claimed disadvantages have been considered advantages by others.” [Lado 1964]:

- Even if the above-mentioned references cited that translation is unnatural phenomenon in the TL classroom, the learners claim that it is totally natural. Danchev [1983] confirms this by stating that many students naturally use translation as a learning approach even when they are told not to do so. However, he suggests being judicious about the use of translation in the L2 classroom.

This was confirmed by Malmkjær1998 [1998] who points out that “it is often unavoidable that translation occurs in many L2 learners’ mind because it is, unsurprisingly, a natural cognitive function that activates when students encounter writing, reading, speaking or listening tasks”. Thus, “asking students to avoid using their mother tongue is a rather unnatural practice”, Malmkjær1998 [1998] adds. Leonardi [2011:8] claims that the use of translation in L2 classrooms is a deliberate choice of the teacher but a ‘naturally-occurring and cognitive activity of students when learning a foreign language which cannot be stopped or avoided.

- As far as for the claim that translation is a time-wasting task, Leonardi [2010] contends that it is unfair to regard translation as a time-consuming activity that takes up valuable time if the activity enables students to practice several language skills – reading, writing, speaking and listening - at once. As to the concern on time consumption, she suggests that shorter texts can be used in class, while larger texts can be assigned as homework and discussed in class

afterwards as a means to practice listening and speaking skills.

- As for the negative interference of L1 arguments. The opposite view is adopted by some researchers [Harvey 1996; Malmkjær1998 1998; Schmidt 1990]. Translation activities, according to Duff [1989], allow avoiding interference since they involve contrast between the SL and TL. He adds that this way the students become aware of the differences that exist between the TL and their MT. A third class of researchers is composed of those who believe that both negative and positive transfer from L1 to TL, but they also state that the negative type of transfer is manageable, or may be overcome or neutralised as Weller [1989:45] reports:

It has been argued that translation of the native language into the target language induces learners to make errors and thus amounts to setting traps. Empirical observation however has shown that the same kinds of errors attributed to translation also occur when learners produce target language utterances without setting out from a native language (such as free composition). *By applying translation consciously* and systematically, learners can be conditioned to monitor their own code switching.

This argument, stating that negative interference does not only occur when translation is used in the EFL classroom, but also in monolingual classrooms, was also given by [Vermees 2010] who confirms that interference also occurs when using any other teaching methodology, so, it is illogical to associate it with translation. To correct the unavoidable L1-induced errors, caused by students silent translation; Titford [1985:85] proposes using translation by the teacher, this way the latter would be able to correct the students ‘L1-induced errors’ [Lo 2016]. This view was shared by Leonardi [2010] who thinks that using translation helps guiding the students and helps them to learn the differences between L1 and L2, he stated then that translation should be seen as ‘facilitation’.

- Using what Lado [1964] calls ‘proper instruction’ allows avoiding the wrong belief that the MT and the TL have absolute equivalence. Such a delusion may be dispelled, as Snell-Hornby [1985] argues, by using translation ‘rationally’ and not ‘intuitively’. Malmkjær1998 [1998] confirms this when proposing that judicious use of translation in the TL classroom results in the students quickly comprehend that there is no absolute equivalence between the TL and their MT. Through the use of different language items in different situations, as Lado [1964] explains, it becomes clear to the students that no one-to-one equivalence exists between L1 and the TL.
- Concerning the claimed fact that translation is a fifth skill that has nothing to do with the other four skills, Malmkjær1998 [1998] counters it by stating that translation both depends and is inclusive of them. He explains that “language students who are translating will be *forced* to practice them” [ibid:8]. This relation of inclusion between translation and the other four skills was also confirmed by Leonardi [2010]. According to him, students *read* the ST, *write* the TT, and they are likely to discuss their peers’ translations, which involves *speaking* and *listening*.

Other arguments, as well as detailed discussion of the above-mentioned arguments could be found in [Carreres 2006; Balabakgil and Mede 2016; Lo 2016; Malmkjær1998 1998]. Finally in Danan [2010] words, “translation is like a medicine in that it could be harmful if used inappropriately but can bring positive effects when judiciously used in the right way and with the right dose.” Lado [1964] summarises some of the above arguments and how to deal with translation in EFL classrooms:

Many arguments against the use of translation in L2 fall away when translation is understood in a less de-contextualized way and used in a way that resembles actual translation practice, because this encourages students to engage in the four essential language skills and enhance their L2 proficiency . . .

Vermes [2010] summarises the philosophy of how translation role should be seen in language learning classrooms, by stating that “[t]he objections to the use of translation in foreign language teaching are all based on a limited view of translation.” He adds that “translation is not only structure manipulation; it is primarily a form of communication. And as such, it necessarily involves interaction and cooperation between people, which makes it a potentially very useful device in foreign language teaching.” [Vermes 2010:91].

Conclusion

This chapter provided a theoretical study of the arguments against or supporting the use of the MT or translation in EFL classrooms. In a first part, the type of relation that may exist between translation L1/MT and FL was discussed. Then, we presented the arguments that were reported in the literature as reasons to ban the use of the MT in the EFL classroom, the pros of MT use were then detailed. The same scheme of analysis was introduced for the case of translation; we gave the cons then moved to the pros.

As well seen from this chapter, one could easily conclude that the view has changed from a total ban of L1/translation in EFL classrooms, to its use as a very useful pedagogical tool. The next part of this thesis presents the contributions proposed in this thesis. The first one consists of an experimental study of the usefulness of L1/translation in the EST classroom, while the second focuses on the analysis of the learners’ attitudes towards the use of translation in and EST context.

Part II

Contributions : Translation Use for Boosting EST Learning

- Experimentation
- Analysis of Attitudes
- Pedagogical Implications

**The Impact of L1/Translation Use on EST
Learners' Language Proficiency**

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Introduction

As already stated in the introduction of the thesis, we study here the impact of introducing EST concepts for computer science learners through the use of translation. This first contribution could be summarised as follows. We have opted for the use

of an on-the-fly translation, in which the teacher uses translation just to explain ambiguous terms or ideas related to the presented material if needed.

To check the effect of using translation on EST learners' comprehension abilities, we devised a test-based experimental study. The test and experiment groups have been taught EST for one semester with the use and exclusion of translation into French/Arabic, respectively. A pre-test and post-test have been conducted. Then, a statistical analysis has been carried out. This chapter details both the rationale of this study and its validity testing ¹.

3.1 Motivations

A very common problem that most Algerian EST teachers face, nowadays, when dealing with students is the inability of a big number of these students to understand the lessons given if the only used language during sessions, as medium of communication, is English. Many teachers, who adopted the monolingual communicative approach [Howatt and Widdowson 2004], prefer not to use any other language but English; in order, as they argue, to avoid putting students at a non-return point, in which the students' fluency and spontaneity in using English is likely to be negatively affected by the use of the other language (generally the mother tongue).

However, students are all the time complaining that they would never be able to learn a language they do not understand at all. In addition, they claim that all they need from learning English as a foreign language is to become able to understand the documents they meet in their fields of study, or later in their jobs. The latter belief with the previously-stated problem would in many cases make them give up. This may even let them escape the EST sessions.

¹The findings of this first contribution have been published in the 'Revue Sciences Humaines' journal, so some passages have been quoted verbatim from [Draa 2019].

Primary observations got from teaching English for computer science students, at Constantine 2 University, showed that using the students' mother tongue, or any other language they know better than English (French for instance), would boost their interest in English as a module, and make them feel at ease during English classes. In this perspective, this first contribution investigates the impact of using translation for EST teaching on students' comprehension abilities. Hence, an English-into-Arabic/French (and vice versa) translation approach has been adopted with an experimental group. Basically, translation has been introduced for explaining the studied material (the in-class presented text) whenever comprehension difficulty is met.

3.2 The Study

This section presents the details related to the implementation of the devised experiment on a set of students and the methodology we followed to decide whether we accept or reject the hypothesis of research, related to the usefulness of including translation in EST classes. After formulating our question of research and defining the implied hypothesis and the research variables, we describe the subjects on which we carried out our experiment. Then, the pre-test post-test experimental control group design we opted for is presented.

3.2.1 Aim of the Study and Research Question

This study aims at investigating the impact of using translation for EST teaching on students' comprehension. The following question of research has been asked: *“Does the use of translation from English into L1, Arabic – or French (for foreign students) – in our case, for teaching EST improve students' comprehension of the presented material?”*

We put the following hypothesis. *“If teachers used translation activities when teaching*

English for science and technology, this would improve the learners' comprehension abilities".

3.2.2 Research Variables

Three variables have resulted from our hypothesis of research and the experimental design for which we opted. The dependent variable is the learners' comprehension of the presented material. The independent ones are the introduction of translation on the one hand and time on the other hand. In fact, the latter variable resulted from the experimental test design we have chosen: a pre-test post-test control experimental group design. The dependent variable is a quantitative one, measured by a marking system, while the independent ones are of a qualitative nature.

3.2.3 The Subjects

The present study took place in the Faculty of New Technologies of Information and Communication, Constantine 2 University. Two groups of students, 25 each, were sampled from a class of computer science Master 1 students. These two groups constituted the control and experimental groups.

3.2.4 The Method

First, the two samples from the studied population (Master 1 students of computer science) have been chosen randomly. The first sample is the control group which has been taught with the traditional approach, i.e. without any use of translation during EST classes. The second group, the experimental group, has been taught using some translation. We have proceeded as follows.

A pre-test has been administered to both groups in order to evaluate their initial comprehension abilities of EST texts. After that, both groups have been taught EST for one semester with the introduction of translation when teaching the experimental

group, while only English has been used with the control group. Next, both groups have undergone a post-test. Finally, A statistical analysis has taken place in order to confirm or dis-confirm the initial hypothesis of the research. The obtained results have been also analysed qualitatively.

3.2.5 Test Design

In order to study the before/after control/impact aspects of the use of translation for teaching EST, we have chosen the pre-test post-test control experimental group design. It is the most appropriate to measure the effect that the experimental group had from introducing translation when teaching it, without ignoring the effect that the teaching operation might have on the overall level of comprehension of students. In simple words, we have had to be sure that if a more significant improvement of the experimental group's level over the control one has been found, this has not been the result of an initial difference between the groups.

In this type of experimentation, both the control and experimental groups are evaluated with respect to the dependant variable, abilities of reading comprehension, before implementing the treatment (using translation in our case). Then, the experimental group receives the treatment. Finally, the two groups are re-evaluated to see to what degree the dependant variable is affected by the independent one(s).

A. Pre-test

A pre-test has been undergone by both groups, control and experimental, in order to evaluate their initial comprehension abilities. More precisely, we wanted to see if there were any significant differences between the two groups in terms of reading comprehension. For measuring the reading comprehension of students, we provided them with a text in their field of study, computer science, and asked them to give the meaning of some technical terms from the text. They were also asked to

translate these words from English into French and Arabic, respectively.

We started from the idea that if the text were comprehended, the student would be able to give the meaning of a given term, basically from the context. The presented text is given in the appendix; the terms in question have been underlined. When marking the students' responses, giving the meaning of words has been accorded more importance; we assumed that a genuine comprehension of the term would be reflected by the ability of the student to express the core of its meaning. It is worth to mention here that we did not consider writing-related mistakes; if the main part of a terms meaning was given, the whole mark was attributed.

B. Teaching With and Without Translation

After conducting the initial evaluation of the students' comprehension abilities, both groups were taught EST material for one semester as follows:

- With the experimental group, we used French or Arabic during EST classes to explain difficult terms, expressions or even concepts and ideas related to the material being dealt with.
- We did not use translation with the control group, but we moderately allowed students to use Arabic or French.
- Both groups were taught EST for a whole semester, 1.5 hours per week; about ten sessions.
- Both groups were taught by the same teacher.

In the sessions, computer-science texts were studied. The students were asked to read the presented text. The role of the teacher was to read and explain the content of the text. Some grammar rules, phonology and other English language aspects were slightly presented in parallel. For the control group, only English was used by the teacher, and the students were encouraged to use only English. With the experimental

group, difficult terms and ideas were translated or explained using basically French, the main language used in the students' training programme. Furthermore, the teacher was allowed to use Arabic whenever the situation required it.

C. Post-test

After the students had attained about ten sessions of EST, both sets underwent a post-test. It aimed at evaluating their comprehension of one new text. The same procedure adopted in the pre-test was used. The post-test text was different from the pre-test text. In fact, it was more difficult, not in terms of the included technical terms, but it used a harder technical style. This difficulty is, in fact, a good way to check whether the students could get the meaning of new words from the context (the text).

It is worth to mention that we consulted about twenty computer science teachers and PhD students to compare the two texts in terms of difficulty. The big majority of them agreed on the fact that the post-test text was harder to read and comprehend. Thus; when marking the post-test, we gave the students' scores more importance than that we gave for their performances in the pre-test. The post-test text is also presented in the appendix.

3.3 Statistical Analysis

In order to accept or reject the hypothesis of research, stating that the use of translation when teaching EST would help the learners improve their reading comprehension abilities, we have had to analyse the supposed students' improvement statistically. We have two independent variables, 'time' (before/after teaching) on the one hand and 'group' (introducing/excluding translation) on the other hand; and a dependent one: students' comprehension. Thus, the suitable statistical test is the mixed model analysis of variance (Mixed ANOVA). The latter statistics aims

at measuring not only how the independent variables have had (or not) an effect on the dependent one; but it allows knowing whether there is some interaction between these variables.

The choice of the mixed ANOVA statistics has been also motivated by two points:

- a. It allows considering some randomness in the choice of subjects; this was our case, since there were many ways the two groups, of 25 subjects each, could have been chosen from the whole population. On the whole, there were about 300 Master 1 students, from which only 50 have been chosen to be subjects of the study.
- b. The test, in addition to the general vision it offers about the data, permits the mutual comparison, using a t-test, between each couple of pre/post experimental/control configuration. This permits a deeper analysis of the supposed improvement if it has taken place.

It is to be noted here that the subjects of the experiment have not been paired. So, it is an independent-group test. Again, the mixed models test is suitable for the case. The significance level has been set to 0.05, and the hypotheses of the statistical test have been chosen to be:

- **The null hypothesis, H0:** There is no significant difference between the means of the four groups.
- **The alternative hypothesis, H1:** There is a significant difference between the means of the groups.

Table 3.1 presents the correlation matrix between the four groups and the dependent variable comprehension. As seen from the last line/column of the matrix, the greatest value, apart from the self-comparison values, is that of the post-test of the experimental group with the variable comprehension. This means that this group

has a relationship with the variable comprehension stronger than the three other groups.

Tables 3.2–3.3 present the covariance parameters for both the random and fixed independent variable, ‘time’ (pre/post) and ‘treatment’ (with/without translation), respectively. We can see that the fixed variable error variance is significant and the random component variance is not significant. Thus, the random component has not a significant effect on the global model. This means that sampling other groups of students from the population would have the same effect on the whole study. As seen from Table 3.4, the experimental group has had a significant effect on the comprehension variable.

Figure 3.1 shows how the means of scores of the two groups being studied evolved over time. As well seen, the control group has had a better mean than the experimental group in the pretest (45.08 vs. 41.81). However; in the post-test, the experimental group has performed better (60.68 vs. 55.41). This proves that the use of translation with the experimental group has improved the students’ comprehension abilities. This fact is also proved by the comprehension prediction model given in Figure 3.2. It is clear that even if the control group (with blue circles) performed better than the experimental one (with magenta circles) in the pretest; the inverse is true in the post-test (green vs. red). Figure 3.3 also confirms this effect.

Table 3.1: Correlation Matrix (reprinted with permission)

Variables	gr-ctrl-pre	gr-exp-pre	gr-ctrl-post	gr-exp-post	Comprehension
gr-ctrl-pre	1.000	-0.333	-0.333	-0.333	-0.160
gr-exp-pre	-0.333	1.000	-0.333	-0.333	-0.258
gr-ctrl-post	-0.333	-0.333	1.000	-0.333	0.116
gr-exp-post	-0.333	-0.333	-0.333	1.000	0.302
Comprehension	-0.160	-0.258	0.116	0.302	1.000

Once the overall comparison of the groups proved that there is some difference

Table 3.2: Covariance Parameters – Random Effects

	Parameters	Standard error	Z	Pr >Z
Variance	0.000			

Table 3.3: Covariance Parameters - Repeated Facto

	Parameters	Standard error	Z	Pr >Z
Variance	590.555	83.517	7.071	<0.0001

of means between the four groups (experimental-pre, control-pre, experimental-post and control-post), it becomes crucial to carry on with a multiple pairwise comparison. Tables 3.5–3.6 present the Tukey multiple pairwise comparison results. It is clear that there has been some difference in terms of means between the different pairwise-compared groups.

In Table 3.5, what matters is the last column that presents the existence or absence of differences between means of several pairs of groups. In our case, we are more interested in the pair: gr-ctrl-post vs gr-exp-post, reflecting a potential influence of translation on comprehension abilities. In fact, we have to be cautious about generalising to accept the hypothesis of research, because the same table indicates that there has been some difference between the control and experimental groups before applying the experimental procedure: gr-exp-pre vs gr-ctrl-pre. Table 3.6

Table 3.4: Model Parameters

Source	Value	Standard error
Intercept	53.669	4.860
Group-ctrl-pre	0.000	
Group-exp-pre	-4.645	6.873
Group-ctrl-post	7.872	6.873
Group-exp-post	17.084	6.873

confirms this conclusion.

Table 3.5: Tukey (HSD) / Analysis of the Differences Between Categories With a Confidence Level of 5%

Contrast	Difference	Std difference	Critical value	Pr >Diff	Significant
gr-exp-pre vs gr-exp-post	-18.872	-3.637	0.536	0.002	Yes
gr-exp-pre vs gr-ctrl-post	-12.601	-2.429	0.536	0.078	Yes
gr-exp-pre vs gr-ctrl-pre	-3.278	-0.632	0.536	0.922	Yes
gr-ctrl-pre vs gr-exp-post	-15.594	-3.006	0.536	0.018	Yes
gr-ctrl-pre vs gr-ctrl-post	-9.324	-1.797	0.536	0.281	Yes
gr-ctrl-post vs gr-exp-post	-6.271	-1.209	0.536	0.623	Yes
Tukey's d critical value:	0.758				

Table 3.6: Categorisation of Groups according to Tukey (HSD)

Category	LS means	Groups
gr-exp-pre	41.811	A
gr-ctrl-pre	45.088	B
gr-ctrl-post	54.412	C
gr-exp-post	60.682	D

In order to make things clear regarding this point, we give in Tables 3.7 and 3.8 the results of pairwise comparisons of different groups given by the Dunn-Sidak statistics. Table 3.7 states that there has not been a significant difference between the two groups under study before applying the experimental method (see gr-exp-pre vs gr-ctrl-pre), but once the treatment (use of translation) was applied, the two groups behaved differently. Hence, it is concluded that the introduction of translation into the EST class has had a significant effect on the experimental group.

Table 3.8 confirms this conclusion; it shows that before the experiment, both groups belonged to the same class: A; but after having applied the method, the control group has become different: class B. More importantly, the experimental group has moved to another class: class C. In simple words, both the control and experimental

groups have improved over time, but the improvement of the experimental group has been larger, which can be interpreted by being the effect of introducing translation in classes.

Table 3.7: Dunn-Sidak / Analysis of the Differences between Categories with a Confidence Level of 5%

Contrast	Difference	Std difference	Critical value	Pr >Diff	Significant
gr-exp-pre vs gr-exp-post	-18.872	-3.637	0.858	0.000	Yes
gr-exp-pre vs gr-ctrl-post	-12.601	-2.429	0.858	0.017	Yes
gr-exp-pre vs gr-ctrl-pre	-3.278	-0.632	0.858	0.529	No
gr-ctrl-pre vs gr-exp-post	-15.594	-3.006	0.858	0.003	Yes
gr-ctrl-pre vs gr-ctrl-post	-9.324	-1.797	0.858	0.075	Yes
gr-ctrl-post vs gr-exp-post	-6.271	-1.209	0.858	0.230	Yes
Modified significance level:	0.393				

Table 3.8: Categorisation of Groups according to Tukey (HSD)

Category	LS means	Groups
gr-exp-pre	41.811	A
gr-ctrl-pre	45.088	A
gr-ctrl-post	54.412	B
gr-exp-post	60.682	C

3.4 Discussions, Pedagogical Implications and Limitations of the Study

The aim of this first contribution was to study the effect of using translation on EST learners' reading comprehension abilities. The experimental results have shown that such an effect is likely to be positive. Statistically speaking, the risk that this effect was the result of randomness is lesser than 5% (Confidence Level value). The numbers and hypothesis testing are in favour of the hypothesis that translation would help EST learner to deal with the texts they are supposed to learn, and more importantly with the research papers they would need to read later to accomplish

their Master 2 projects.

In addition to the mentioned quantitative results, we want to give in the following some extra arguments in favour of using translation with EST learners. They are mainly based on classroom observations, in addition to our experience and that of some teachers who taught the subjects of our study or even of those who taught PhD. Students at the same NTIC Faculty.

- (1) Maybe, the upmost motivation that justifies the use of translation when teaching EST is that the learners feel at ease during EST classes. This was observed with the subjects of our study. Actually, some students from the experimental group stated that they had never been in such a motivating context when learning English. They explained that the handicap they felt for many years had started to vanish. The same thing has been observed with others, mainly PhD, students in the years following the implementation of the experiment.
- (2) Unexpectedly, some of the PhD students we dealt with, who have been thought EST using translation, have opted for writing their research papers directly in English; while the old classes (that have been taught EST only in English) used to write the paper in French, then translate it.
- (3) The use of translation during EST classes has had other benefits such as some contribution to the L1 language. Many students enriched their French/Arabic technical repertoire by new terms.
- (4) The teacher could make a list of the difficulties the learners faced when learning English. They were, for the first time, allowed to state explicitly in their mother tongue the difficulties they had to learn English. Actually, this step is a crucial pre-requisite of ESP content design: needs analysis.
- (5) Some tips for the use of translation when devising future EST courses for computer science students have been collected by the teacher. This has been

later implemented especially with PhD students.

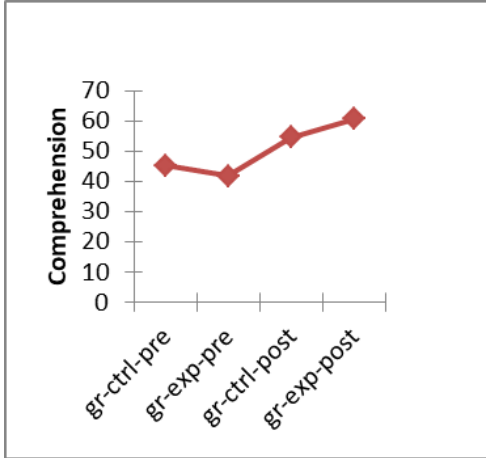


Figure 3.1: Means Charts: Comprehension Mean for Different Groups

As a summary of the pedagogical implications, we cite the following:

- (1) EST students, at Constantine 2 University, should be allowed to use their mother tongue during English classes.
- (2) Working on improving EST students' fluency in English should not be with a brutal and total ban of the use of their L1. A gradual reduction of the amount of L1 use in L2 classes would give better results than a total sudden ban.
- (3) Even when banning L1 from EST classes, translation should be kept as an activity in the curriculum.
- (4) It has also been observed that the accuracy of the subjects when using French and Arabic was weak. Again, implementing translation as a supporting activity would help the learners work on their accuracy in these two languages.
- (5) The inclusion of translation in the EST curriculum becomes a need for a better mastery of the presented EST-related material.

Finally, the main limitations of this study can be summarised in two points. First, the samples that have been considered for the experimental analysis are relatively small

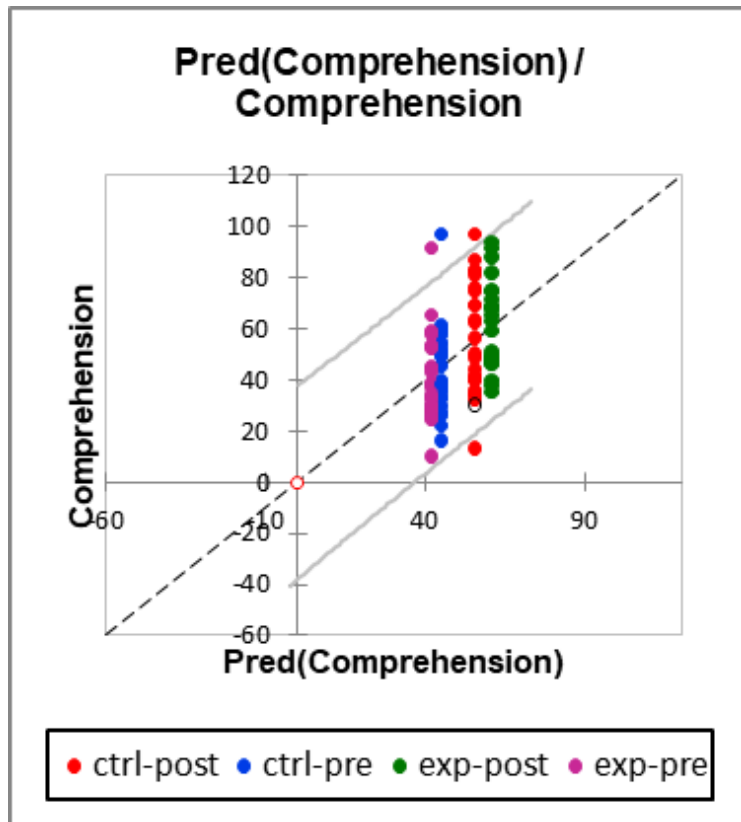


Figure 3.2: Comprehension Prediction

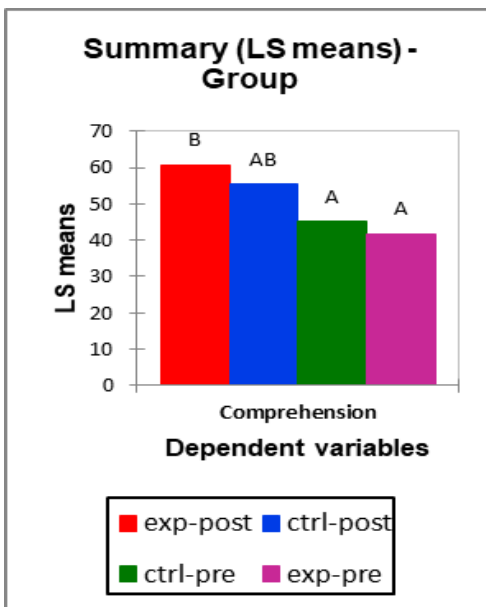


Figure 3.3: Comparison of the Means between Groups over Tests

to provide more confidence when generalising the findings of the research. Second, ten sessions of tutoring the students, about 15 hours, is not really a sufficient period that allows seeing the predicted positive effect of translation on EST learners.

Conclusion

In this first practical study, the effect of using translation on EST learners' reading comprehension abilities has been studied. We devised, implemented and statistically analysed an experiment on two samples of computer science students in the Faculty of New Technologies of Information and Communication, Constantine 2 University.

The findings confirmed the hypothesis of research, which states that translation helps EST learners improve their reading comprehension abilities. Some pedagogical implications have been also given to a better exploitation of translation in the EST curriculum. The next chapter targets another aspect related to this first contribution; it is an empirical analysis of the students attitudes toward the use of the mother tongue or translation in EST classrooms.

**EST Learners' Attitudes towards the Use of L1 in
EST Classrooms: Case Study of Computer Science
Students at Constantine 2 University**

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Introduction

It is a fact that students' motivation strongly impacts their learning in general and their learning of foreign languages in particular. So, it is evident that before implementing any new methodology to language learning or proposing a new course content, a deep solid research should take place. In this perspective, the second

contribution we propose in this thesis is a questionnaire-based analysis of students' attitudes towards the use of L1/translation in EST classrooms.

This chapter aims at describing this second contribution. We start by briefing the rationale, the question of research and the hypothesis. Then, we determine the method by presenting the subjects of the study and indicating the questionnaire design. Finally, we thoroughly discuss and contextualise the obtained results.

4.1 Rationale, Research Question and Hypothesis of the Present Study

The rationale for this work stems from the strong correlation that exists between the learners implication/motivation and the success of the foreign language learning operation. The aim of this study is then to explore the EST learners' attitudes towards the use of translation/L1 in the EST classroom.

The main research question was set to: "Do EST learners have positive or negative attitudes towards the use of L1/translation in EST classrooms?" Other secondary questions raised during the design and implementation of this research such as:

- (1) If L1/translation was used as a pedagogical tool, what are the students' preferences with respect to the language aspects to be targeted?
- (2) Do students prefer to use Arabic or French as facilitation during EST sessions?
- (3) What are the conclusions that could be drawn with regard to the current situation of EST in the faculty of new technologies of Constantine 2 University?

In an attempt to answer the main research questions, we initially hypothesised that: "EST students specialising in computing in the NTIC Faculty of Constantine 2 University have positive attitudes towards the use of translation/L1 in EST classrooms". Further sub-hypotheses then appeared to include:

- (1) Students think translation is more beneficial to learn vocabulary more than any other language feature.
- (2) Algerian EST learners prefer French over Arabic when translation takes place.

4.2 The Method

This section presents the methodology we opted for to implement this second contribution and analyse the validity of its hypothesis.

4.2.1 Subjects of the Study

The subjects of our study were Master 1 students in the Faculty of New Technologies of Information and Communication, Constantine 2 University. These students are supposed to have had EST courses during the years of the first tertiary level, in addition to a semester of at Master 1 level. The questionnaire was submitted to the subjects at the beginning of the second semester.

4.2.2 The Questionnaire

As mentioned previously, in order to investigate the students' attitudes towards the use of L1/translation in the EFL classroom, and more particularly in the EST classroom, we have devised a questionnaire (Appendix 3). We detail here the questionnaire's sections and describe the goal of each part.

A. Personal Information and General Attitudes about EST Course Content

In addition to the context and the adopted teaching methodology, it is a fact that the individual-related factors influence, even if slightly, the learning process. Thus, the first part of the devised questionnaire aims at collecting some data about the learners age, gender, and their mastery of the English language. The latter

evaluation of level is relatively subjective. In addition, we aimed at knowing about how do students perceive the EST course being taught at their Computing Faculty.

It is worth to mention that even if the information collected from this part tends to give a general framework in our study, since it mainly deals with the processing stage outcomes; building reliable wealthy databases would be of great importance in implementing advanced analyses for possible forecasting scenarios. For instance, some gender-based questions about learners' preferences of using translation in EST classrooms could promote certain researches markets using this structured personal relevant subsection of data.

We present, in the following, the aims of some questions included in this first part.

Question 1 and Question 2: they are just questions about gender and age of the participant.

Question 3: Level of mastery of English. This point would help to categorise the attitudes of students according to their English proficiency. Simply stated, it responds to the question: 'Are positive/negative attitudes toward L1/translation use in EST classrooms correlated to students' English proficiency level? If yes how?'

Questions 4 and 5: 'Your average in the first tertiary training programme'; 'Your mark of English exam in the first semester of this year'. We aim here at checking how students evaluate their proficiency with respect to the educational marking system.

Questions 6 and 7: 'How do you evaluate your level of English before you come to the university?'; 'How do you evaluate your level of English just before starting the master training programme?' In these two questions, the students are asked to tell about how they witness their English learning progress. In other words, we asked them whether they are satisfied with their learning of English after having finished the first tertiary level.

Questions 8 and 9: ‘Are you pleased to receive English education in your institution?’; ‘On a scale from 1 to 10, how much are you satisfied by the EST programme presented in the English lectures of the current year?:’

These two questions investigate the students satisfaction with the currently taught EST content and more precisely that one taught during the first semester of the same year in which the present questionnaire has been distributed; the present study took place in the second semester of the academic year.

Questions 10 and 11:‘On a scale from 1 to 10, could you please evaluate your degree of mastery of French?:’;‘On a scale from 1 to 10, could you please evaluate your degree of mastery of Standard Arabic?’. These two questions help in informing us whether students proficiency in *standard* Arabic or French has a strong correlation with their perception of using translation in EST classrooms.

It is true that French is neither an L1 nor a second language in Algeria, but it is important in our study since it serves as the language of studies in many science and technology departments. In addition, most students understand French much better than English. Thus, one would automatically think of it as another potential tool that could be used in EST classrooms.

B. On the Use of Arabic or French in the NTIC EST Classroom

This part is the core of the questionnaire; it helps in directly collecting exploitable data from which the question of research ‘Are Algerian EST learners with or against the use of L1/translation in the EST classroom?’ could be answered. Similarly, we present in this section the aim of these questions.

Questions 1: ‘Should Arabic be used in the EST classroom?’. This section aims at seeing whether the mother tongue, and not translation, is accepted or not by the subjects of our study.

Questions 2: ‘Should French be used in the EST classroom?’. It is a fact that at the tertiary level, particularly in technical fields, French is the language used as medium of communication during classes in all subjects except English. It is used semi-formally at NTIC Faculty. Thus, it is logical to ask whether using French as an assistant pedagogical tool would be helpful for EST teaching.

Questions 3: ‘If you think Arabic or French use is necessary in the classroom, check the reasons from the following ...’. This helps in deciding the reasons for which students are with or against the use of Arabic/French in EST classrooms. The choices given for them range from the simple aid with vocabulary matters to developing intraclass interaction.

Questions 4: ‘Do you like your teacher to use Arabic or French in the classroom?’. This question explores the students’ attitudes towards the *specific* case of teachers using Arabic/French in EST classrooms.

Questions 5: ‘When do you think it is necessary to use Arabic/French in the English classroom?’. This question could be seen as an extension of Question 3. in which more specific choices are given. We see that, in this question, using the MT or French for *talking about language* and for *classroom management* raise as new possible uses to be accepted or rejected by the students.

Questions 6: ‘How much do you think the use of French or Arabic in the classroom helps you to learn English?’ This is a synthesis of Questions 1 and 2, it is put here to help in analysing the validity of the questionnaire. If the same student responds very differently to the pair Question 1 – Question 6 or the pair Question 2 – Question 6, this would be interpreted as a non-serious response, which means that the whole responses should be treated carefully.

Questions 7: ‘If another language, but English, is to be used during EST classes, which one do you prefer to be used?’ This question analyses the

preference of the students; whether they prefer Arabic or French as a facilitating tool for EST learning.

Questions 8: ‘How often do you think Arabic/French should be used in the classroom?’ This is just another formulation of Question 6 used for checking the validity of students’ responses regarding their focus on the questionnaire.

Questions 9: ‘How often do you think the reading texts should be translated into Arabic/French?’ Starting from this point, we aim at knowing about translation-related opinion of students more than about their MT/SL use related one. This question is particularly about the *reading texts* used as material during EST classes.

Questions 10: ‘Do you prefer that the reading text be translated?’ Question 9 is repeated for checking validity.

Questions 11: ‘When doing exercises during EST sessions, do you mentally translate from Arabic/French into English?’ This helps in knowing about the potential occurrence of what many researchers see as *unavoidable silent translation*.

Questions 12: ‘While reading professional texts I use a bilingual dictionary to translate unknown words.’ This particular question focuses on vocabulary. We wanted to know about how much the dictionary; bilingual in this case, is used by the students to deal with the studied material.

Questions 13: ‘In EST vocabulary tests, it is easier for me to translate terms from English than into English’ This investigates the preferred direction of translation in dealing with tests; MT into TL or the opposite direction.

Questions 14: ‘In listening activities, I often mentally translate what I hear’. This helps in knowing about how much mental translation occurs, especially for the listening skill development.

Questions 15: ‘Have you had any bad experience with the ban of using Arabic/French in pre-university EFL classes?’ We want to see whether the monolingual pre-university classroom influenced on the learners’ motivation or not.

Questions 16: ‘If yes, give a percentage of the degree of the ban influence on your English linguistic achievements:’ We measure here the amount of harm caused by banning L1 in the EFL classrooms if any.

Questions 17: ‘If Arabic/French is to be used during EST classes, in what part of language learning would you prefer it to be implied in?’ This question helps in deciding about any potential implementations of pedagogical MT/translation use when designing courses for EST learners.

4.2.3 Approach and Data Collection

The questionnaire has been distributed to 63 first year Master students who specialised in Sciences and Technologies of Information and Communication (STIC) during the academic year 2017/2018. The choice of this option among the four Master programs was motivated by the fact that the author was teaching them, this guarantees more seriousness from the part of the students towards responding to the questionnaire.

When asked to answer the questions, the students were allowed to ask about any detail. Moreover, the teacher explained many parts of the questionnaire in English; French and Arabic. This aimed at avoiding any confusions that may possibly alter the genuinely drawn conclusions. The data collected from the questionnaire was then collected and analysed.

4.3 Experimental Results and Discussions

As stated above, this questionnaire has been filled by the students. Then, data was collected and analysed. We start here by giving a holistic view of the numerical

results, then the responses to each question are separately analysed with greater details.

4.3.1 Personal Information and Students' Self-evaluation

Table 4.1 summarises the data related to the personal information of students and their general level of proficiency in Arabic and French. It is worth to mention that void responses were discarded when these percentages were calculated. As seen from the table, the average age of the subjects was 23. There were less male students than female with 40% males and about 60% females (See Figure 4.1). Most students, with a rate of almost 60%, believed they had a pre-intermediate level of English mastery, compared to 20% and 20% ratios for elementary and intermediate levels respectively. This is confirmed by the teacher in-class observations¹ (See Figure 4.2).

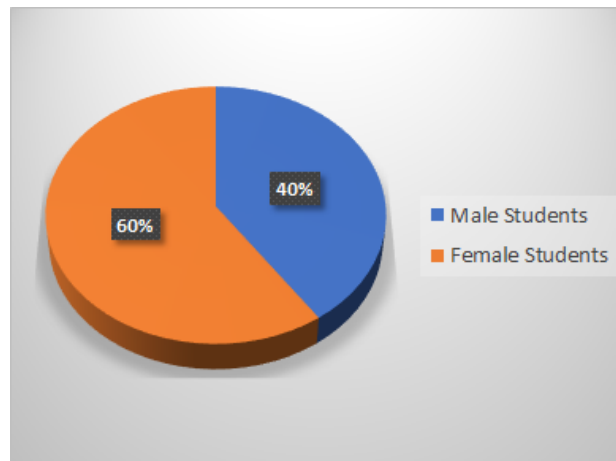


Figure 4.1: Male vs Female Students

As for the overall level of students, the means of their first tertiary level averages is 11.78 out of 20. This shows a fact about the Master programmes adopted at the NTIC Faculty; while the Master degree is supposed to be a post-graduate level, we

¹The teacher of that class for the semester in which the study took place is the author of this research himself.

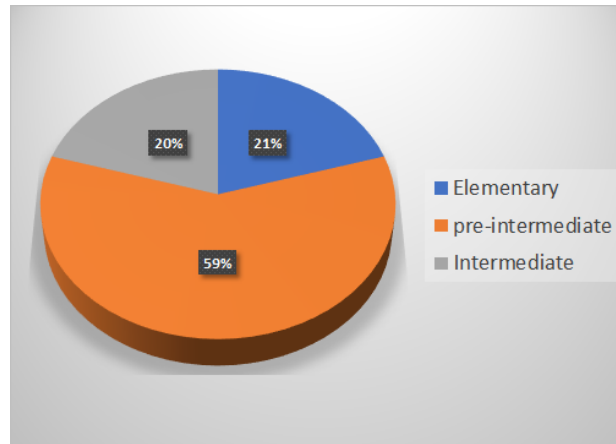


Figure 4.2: Students' Self-evaluation of Their English Level

find that it is offered to almost everyone who has a 'licence' degree.

What is most remarkable is that the students have had excellent marks in their first-semester English exam, with a means of averages equal to 15.94. It should be made clear that the first-semester teacher of English was another one different from the author of this research. The issue here is not that the students have had good or even excellent marks, the problem is that after having taught them for about 20 hours, most students could not achieve the elementary level of English mastery, neither have been able to deal with the EST presented material. A further exploration offered a logical explanation: the material dealt with during that first semester was quite basic, it was not even an EST content.

In fact, no needs analysis was done, neither specialised texts were treated. The next years, we tried to closely look at the EST programs offered by other teachers at NTIC Faculty. Unfortunately, we found that most practitioners centred their content on very general texts; having simple general English jargon such as 'mouse and keyboard'. The number of the teaching sessions has been around three to four sessions by semester. What is more shocking is that some teachers copy-pasted some lessons of *phonetics* about 'the organs of speech' which is totally an inappropriate content for EST learners. This partly justifies why students got these marks: simple

Table 4.1: Summary of the Data Related to Personal Information of Students and Their General Level of Proficiency in Arabic and French

Average age of students	23
Number Percentage of female students	25 39.68%
Number Percentage of male students	38 60.31%
Number Percentage of students with elementary level	12 20.33%
Number Percentage of students with pre-intermediate level	35 59.32%
Number Percentage of students with intermediate level	12 20.33%
Means of first tertiary average over all modules	11.78
Means of first semester mark in EST	15.94
Number Percentage of students claiming they had a very bad mastery of English before coming to university	2 3.17%
Number Percentage of students claiming they had a bad mastery of English before coming to university	3 4.76%
Number Percentage of students claiming they had an average mastery of English before coming to university	24 38.09%
Number Percentage of students claiming they had a good mastery of English before coming to university	26 41.27%
Number Percentage of students claiming they had a very good mastery of English before coming to university	8 12.69%
Number Percentage of students claiming they had a very bad mastery of English before starting the Master programme	0 0%
Number Percentage of students claiming they had a bad mastery of English before starting the Master programme	7 11.11%
Number Percentage of students claiming they had an average mastery of English before starting the Master programme	21 33.33%
Number Percentage of students claiming they had a good mastery of English before starting the Master programme	28 44.44%
Number Percentage of students claiming they had a very good mastery of English before starting the Master programme	7 11.11%
Number Percentage of students pleased with having an EST course	57 95%
Number Percentage of students unpleased with having an EST course	3 5%
Average of students' satisfaction with the EST programme	5.56 out of 10
Average evaluation of mastery of French	6.75 out of 10
Average evaluation of mastery of Arabic	7.58 out of 10

content is being taught and simple rushed evaluation is done.

Another point that relatively explains the students' disinterest in EGP and ESP lessons offered at the tertiary level in the NTIC Faculty is well seen from the students responses to question 6; most of them believe they have an average to a good level of English. More precisely, more than 38 % said they have an average level, and more than 41% claimed they are good at English mastery, see Figure 4.3. Very similarly, most of the students believed they have either an average (33%) or a good (44%) mastery of English before they started the Master degree programme, see Figure 4.4. This reveals how much the students are misled with respect to their self-evaluation.

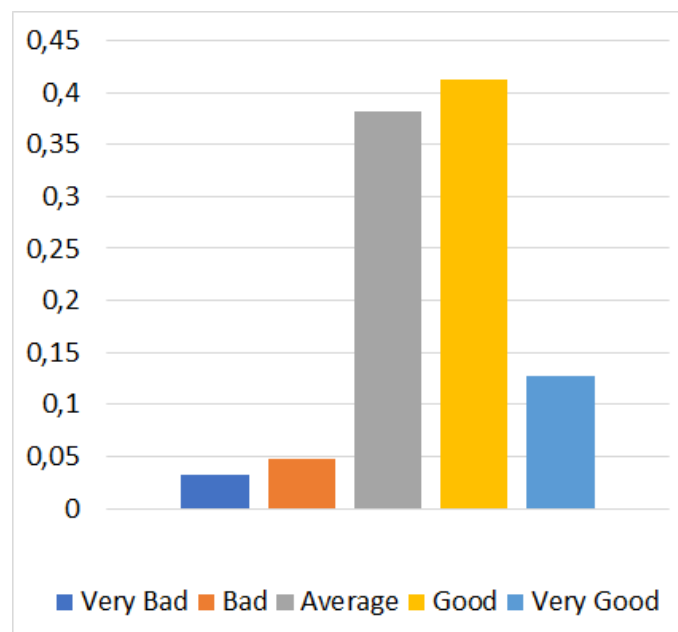


Figure 4.3: Self-evaluation of English Level before University

Almost all students were pleased to be taught EST, with 95% in favour for the course; only 5% were against including EST courses in the curriculum, see Figure 4.5. Besides, the students were generally satisfied with the presented EST course. It is worth to mention that the questionnaire was yielded to students before getting any seriously needs-analysis-based EST course. This confirms the non awareness of the students about what should be presented as a course content of EST at a Master



Figure 4.4: Self-evaluation of English Level before the Master Programme

degree in what used to be considered as a ‘Pole d’Excellence’².

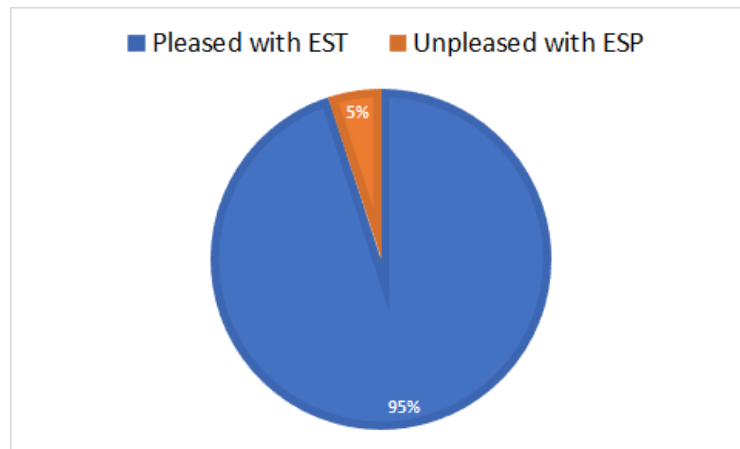


Figure 4.5: Pleased vs Unhappy with the EST Course

Finally, the data collected from this first part of the questionnaire shows that students generally claim they have fairly good level of ‘Standard Arabic’ and ‘French’; the means of self-evaluations was 7.58 out of 10 and 6.75 out of 10 respectively.

²This categorisation of the Faculty of New Technologies of Information and Communication as a ‘pole of excellence’ has been withdrawn in the last year.

Tables 4.2–4.10 present the detailed data collected from the ‘Personal Information’ of the students’ questionnaire.

Table 4.2: Responses to ‘Personal Information’ Part; Students 1–7

Question	Personal Information	Student						
		1	2	3	4	5	6	7
1	Age	23	22	23	23	23	22	24
2	Gender	2	1	1	1	1	1	2
3	Mastery of English	1	3		3	3	2	2
4	First-tertiary Average in English	10.66	13	10.8	13	11.3	11.9	12
5	First Semester Mark	17	17.5	15	17	15.25	15	15
6	Level before University	4	4	3	4	3	3	3
7	Level before Master	3	4	4	4	2	3	4
8	Pleased/Not to get English	1	1	1	1	1	1	2
9	Satisfaction with Content	8	4	7	4	4	5	5
10	Degree of Mastery of French	6	5	8	6	6	7	10
11	Degree of Mastery of Arabic	9	5.5	9	9.5	8	8	2

Table 4.3: Responses to ‘Personal Information’ Part; Students 8–14

Question	Personal Information	Student						
		8	9	10	11	12	13	14
1	Age	23	22	22	22	22	22	24
2	Gender	2	2	2	1	1	1	2
3	Mastery of English	1	2	1	2	2	2	2
4	First-tertiary Average in English	11.26	12	12.3	11	12.32	12.14	11.94
5	First Semester Mark	16	15	14.5	15.5	16.5	15	18
6	Level before University	4	3	2	4	3	5	3
7	Level before Master	3	4	3	4	4	5	3
8	Pleased/Not to get English	1	1	1	1	1	1	1
9	Satisfaction with Content	6.5	8	4	6	8	7	6.5
10	Degree of Mastery of French	5.5	8	7	7	8	9	7
11	Degree of Mastery of Arabic	9	5	8	4	9	8	7

Table 4.4: Responses to ‘Personal Information’ Part; Students 15–21

Question	Personal Information	Student						
		15	16	17	18	19	20	21
1	Age	23	23	22	22	22	23	23
2	Gender	2	2	1	1	2	2	2
3	Mastery of English	2	3	3	3	2	2	2
4	First-tertiary Average in English	12.63	12	11.04	10.78	12.07	11	12
5	First Semester Mark	16	16	15	15	15	18	17
6	Level before University	4	4	4	5	2	5	4
7	Level before Master	4	5	4	4	3	4	4
8	Pleased/Not to get English	1	1	1	1	1	1	1
9	Satisfaction with Content	6	4	8	8	5	2	7
10	Degree of Mastery of French	8	7	6	7	7	8	7
11	Degree of Mastery of Arabic	9	8	9	5	8	6	9

Table 4.5: Responses to ‘Personal Information’ Part; Students 22–28

Question	Personal Information	Student							
		22	23	24	25	26	27	28	
1	Age	23	22	23	22	22	22	22	
2	Gender	2	2	2	2	2	2	2	
3	Mastery of English	1	3	2	2	3	4	2	
4	First-tertiary Average in English	12.45	12	10.54	10.6	12	12	13.9	
5	First Semester Mark	17	16	16	16	16	15	14	
6	Level before University	5	4	5	4	5	5	4	
7	Level before Master	4	5	3	4	5	5	2	
8	Pleased/Not to get English	1	1	1	1	1	1	1	
9	Satisfaction with Content	7	3	9	3	3	1	3	
10	Degree of Mastery of French	8	6	5	5	6	7	6.5	
11	Degree of Mastery of Arabic	9	8	9	8	8	8	6.5	

Table 4.6: Responses to ‘Personal Information’ Part; Students 29–35

Question	Personal Information	Student							
		29	30	21	32	33	34	35	
1	Age	23	22	22	22	22	23	22	
2	Gender	2	2	2	1	1	2	2	
3	Mastery of English	2	2	1	3	1	2	2	
4	First-tertiary Average in English	12.4	13.64	12	11.5	11	10.6	11.16	
5	First Semester Mark	14.5	18	14	16	17	17	14	
6	Level before University	4	3	3	4	3	4	3	
7	Level before Master	4	3	3	3	3	4	4	
8	Pleased/Not to get English	1	1		1	1	1	1	
9	Satisfaction with Content	2	5	7	8	7	4	7	
10	Degree of Mastery of French	8	6	6	7	7	7	7	
11	Degree of Mastery of Arabic	8	8	8.5	8	9	9	6	

Table 4.7: Responses to ‘Personal Information’ Part; Students 36–42

Question	Personal Information	Student						
		36	37	38	39	40	41	42
1	Age	23	23	22	22	23	23	23
2	Gender	1	1	1	1	1	1	1
3	Mastery of English	2	2	2	2	2	3	3
4	First-tertiary Average in English	14.71	12.87	12.3	12.03	11.53	11	13.4
5	First Semester Mark	18.75	18	19.25	17.5	16	16.5	18.25
6	Level before University	5	4	4	4	4	4	3
7	Level before Master	4	4	4	4	2	3	3
8	Pleased/Not to get English	1	1	1	1	1	1	1
9	Satisfaction with Content	2	1	4	3	2	7	6
10	Degree of Mastery of French	7	8	7	7	8	8	7.5
11	Degree of Mastery of Arabic	9	6	9	9	5	9	6.5

Table 4.8: Responses to ‘Personal Information’ Part; Students 43–49

Question	Personal Information	Student						
		43	44	45	46	47	48	49
1	Age	23	23	23	23	23	23	23
2	Gender	1	1	1	2	2	2	2
3	Mastery of English	2	1	1	1	3	3	1
4	First-tertiary Average in English	14	12	11	10.33	11	11	12.35
5	First Semester Mark	17.75	17	15	10	16.5	14	16.75
6	Level before University	3	2	3	1	4	4	3
7	Level before Master	3	2	2	2	5	4	3
8	Pleased/Not to get English	1	1	1	1	1	1	
9	Satisfaction with Content	7	6	7	5	10	6.5	3.5
10	Degree of Mastery of French	7	7	7	2	5	4.5	7
11	Degree of Mastery of Arabic	7	7	8	5	10	6.5	8

Table 4.9: Responses to ‘Personal Information’ Part; Students 50–56

Question	Personal Information	Student							
		50	51	52	53	54	55	56	
1	Age	23	22	24	23	24	22	23	
2	Gender	2	2	2	2	2	2	2	
3	Mastery of English	2	1	2	2	2	2	2	
4	First-tertiary Average in English	14.3	10.51	10.89	10.06	10.6	10.59	10.68	
5	First Semester Mark	17	14	17.5	15.25	14	15	17.5	
6	Level before University	4	3	4	3	3	3	4	
7	Level before Master	4	3	5	4	3	4	4	
8	Pleased/Not to get English	1	1	1	1	1	1	1	
9	Satisfaction with Content	3	7	8	8	8	6.5	6	
10	Degree of Mastery of French	5		9	6	7.5	7	7	
11	Degree of Mastery of Arabic	3	9		8.5	8	9	8.5	

Table 4.10: Responses to ‘Personal Information’ Part; Students 57–63

Question	Personal Information	Student							
		57	58	59	60	61	62	63	
1	Age	22	26	22	23	22	22	22	
2	Gender	2	2	2	2	1	1	1	
3	Mastery of English	2	1	2	2	2	2	1	
4	First-tertiary Average in English	12.19	10.57	12.5	10.5	12.68	11.3	12.25	
5	First Semester Mark	15	15	15.5	15	16	16	16	
6	Level before University	3	1	4	3	3	3	3	
7	Level before Master	3	2	4	3	4	3	3	
8	Pleased/Not to get English		2	1	2	1	1	1	
9	Satisfaction with Content	7	7	4	2	7	7	8	
10	Degree of Mastery of French	5	5	4	5	8	8	9	
11	Degree of Mastery of Arabic	8	6	5	8	6	9	9	

4.3.2 Attitudes towards the Use of L1/Translation in the EST Classroom

This section details the results obtained from analysing the second part of the questionnaire, that focussing on the attitudes of students towards the use or rejection of L1/translation in EST classrooms. The responses are summarised in Tables 4.11 – 4.13. The details of these data are presented just in the following paragraphs.

Table 4.11: Responses to the 'On the Use of L1/Translation' Part; Questions 1–4

Question	Students' Choice/Response	
1. Should Arabic be used in the EST classroom?	Yes: 54%	No: 46%
2. Should French be used in the EST classroom?	Yes: 65%	No: 35%
3. Reasons to use Arabic/French		
a.It helps me to understand difficult concepts better	Yes: 74.6	No: 25.4
b.It helps me to understand the new vocabulary items better	Yes: 65	No: 35
c.It helps me to feel at ease, comfortable and less stressed	Yes: 22.22	No: 77.77
d.I feel less lost	Yes: 27	No: 73
e. It helps developing interaction EST classrooms	Yes: 35	No: 65
4. Do you like your teacher to use Arabic or French in the classroom?	Yes: 20%	No: 80%

Table 4.12: Responses to the ‘On the Use of L1/Translation’ Part; Question 5

Question	Students’ Choice/Response				
Q5. Reasons to use Arabic/French					
a. to define new vocabulary items	SD: 08.06%	SWD: 12.9%	NN: 11.29%	SWA: 48.38%	SA: 19.35%
b. to practise the use of some phrases and expressions	SD: 14.75%	SWD: 13.11%	NN: 26.22%	SWA: 39.34%	SA: 6.55%
c. to explain complex grammar points	SD: 14.28%	SWD: 9.52%	NN: 20.63%	SWA: 31.74%	SA: 23.80%
d. to explain different concepts or ideas	SD: 20.00%	SWD: 11.66%	NN: 13.33%	SWA: 43.33%	SA: 11.66%
e. to give instructions	SD: 24.19%	SWD: 22.58%	NN: 25.80%	SWA: 25.80%	SA: 1.61%
f. to give suggestions on how to learn more effectively	SD: 14.51%	SWD: 19.35%	NN: 35.48%	SWA: 25.80%	SA: 4.83%
g. to summarise materials already covered	SD: 26.22%	SWD: 18.03%	NN: 31.14%	SWA: 14.75%	SA: 9.83%
h. to joke around inside the classroom	SD: 19.35%	SWD: 11.29%	NN: 46.77%	SWA: 16.12%	SA: 6.45%

Table 4.13: Responses to the ‘On the Use of L1/Translation’ Part; Questions 6–17

Question	Students’ Choice/Response				
Q6	Not at all: 6.451%	Very little: 20.96%	Fairly much: 56.45%	Quite a lot: 11.29%	A lot: 4.83%
Q7	Arabic: 21.66%	French: 43.33%	Both: 35%		
Q8	None: 9.67%	Sometimes: 59.67%	Average: 16.12%	Often: 12.90%	Always: 1.61%
Q9	None: 30.64%	Sometimes: 35.48%	Average: 14.51%	Often: 11.29%	Always: 8.06%
Q10	Into Arabic: 28.33%	Into French: 33.33%	Both: 38.33%		
Q11	Yes: 59.67%	No: 40.32%			
Q12	None: 14.51%	Sometimes: 41.93%	Average: 12.90%	Often: 16.12%	Always: 14.51%
Q13	Yes: 47.54%	No: 52.45%			
Q14	Yes: 51.61%	No: 48.38%			
Q15	Yes: 30.64%	No: 69.35%			
Q16	40.72				
Q17	Vocab: Yes: 41.26 No: 58.73	Grammar: Yes: 57.14 No: 42.85	Writing: Yes: 65.07 No: 34.92		

Questions 1 and 2

As seen from table 4.11, the students who agreed on the use of the MT in the EST classroom, as response to Question 1, were a little more than those who were against its use. The rate of proponents was 54%, while 46% of students did not want their MT to be used in the classroom, see Figure 4.6. On the other hand, the acceptance of using French, as response to Question 2, was more remarkable: 65% of students agreed, in contrast to 35% who did not encourage its use, see Figure 4.7.

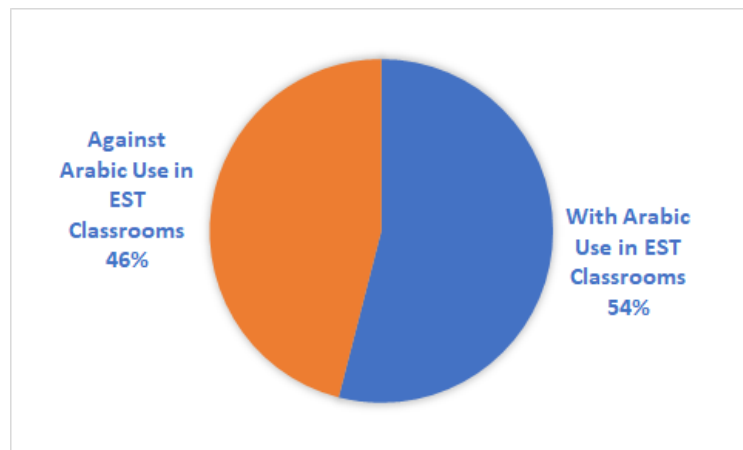


Figure 4.6: Students' Attitudes towards the Use of Arabic in the EST Classroom

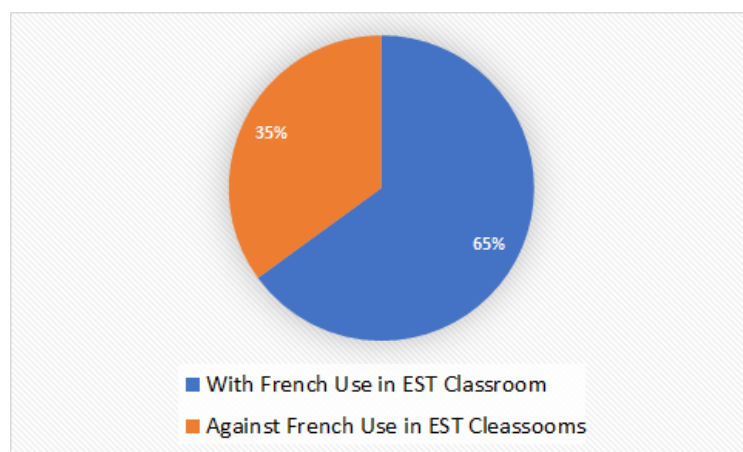


Figure 4.7: Students' Attitudes towards the Use of French in the EST Classroom

Question 3

Considering the students' opinions about the reason to allow the use of Ara-

bic/French, the most adopted choices were: ‘It helps me to understand difficult concepts better’, with 74.6 %, and ‘It helps me to understand the new vocabulary items better’, with 65%. The three other alternatives, ‘reducing stress’, ‘feeling less lost’ and ‘increasing intraclass interaction’, were less adopted: with the rates of 22.22%, 27% and 36%, respectively. This means that the students mainly see that using the L1 or French would help them acquire lexis more than developing other aspects of the language, see Figure 4.8 – 4.12.

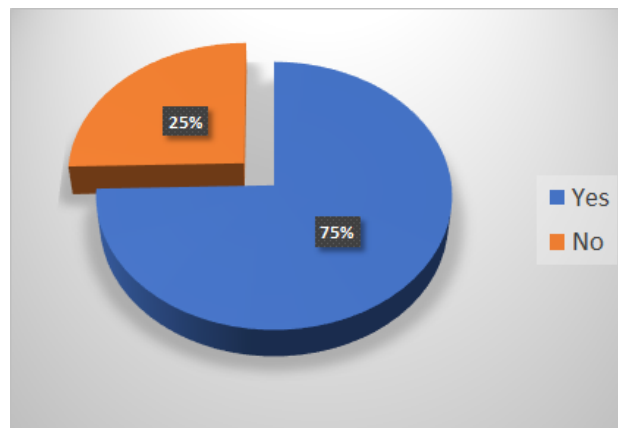


Figure 4.8: Students’ Responses to the Statement: ‘It helps me to understand difficult concepts better’

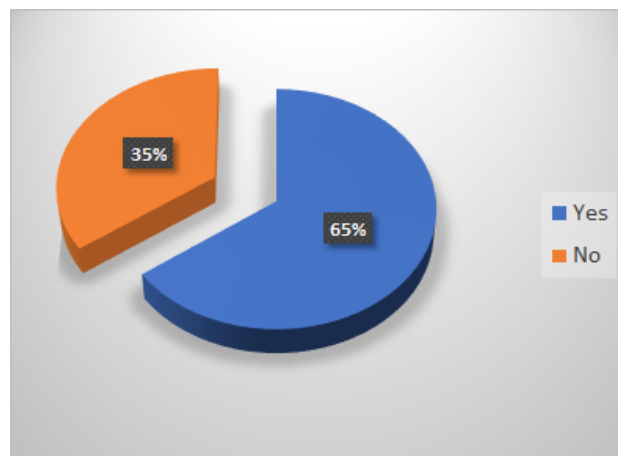


Figure 4.9: Students’ Responses to the Statement: ‘It helps me to understand the new vocabulary items better’

Question 4

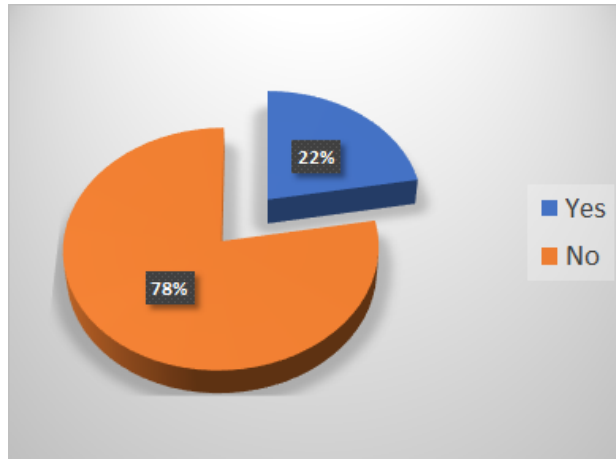


Figure 4.10: Students' Responses to the Statement: 'It helps me to feel at ease, comfortable and less stressed'

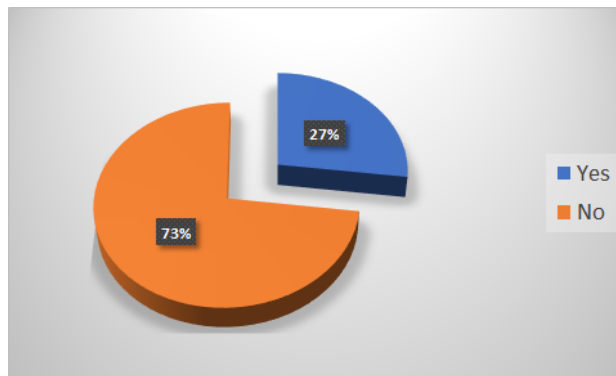


Figure 4.11: Students' Responses to the Statement: 'I feel less lost'

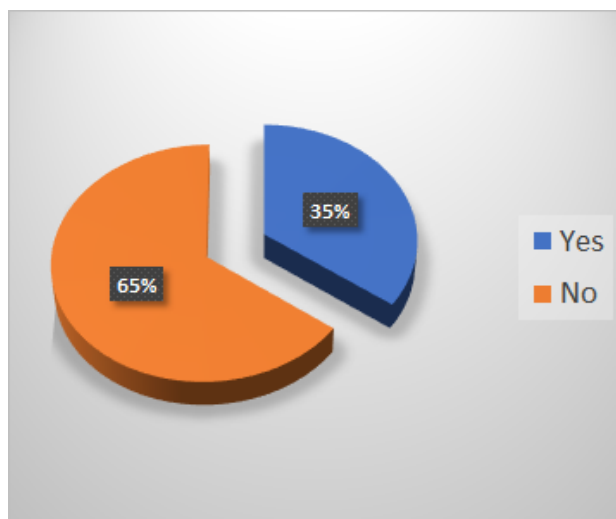


Figure 4.12: Students' Responses to the Statement: ' It helps developing interaction in EST classrooms'

The students negatively responded to whether they are with the EST teacher's use of Arabic/French in the EST classroom: 80% were against and only 20% encouraged this use. A logical explanation to this response is the students consciousness of the fact that their EST teacher is a valuable source of genuine use of English, see Figure 4.13 .

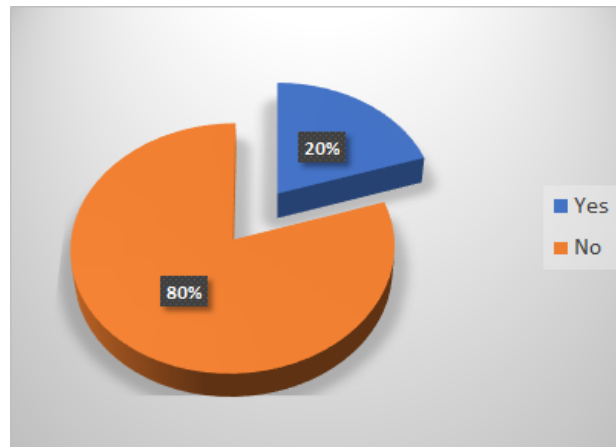


Figure 4.13: Students' Responses to the Question: 'Do you like your teacher to use Arabic or French in the classroom?'

Question 5

The responses to Question 5, another form of Question 3 about the reasons for the Arabic/French use in EST, are relatively similar to those obtained from the responses to Question 3.

Most students believed that the role of L1/French is to help in learning vocabulary: on the whole about 60% of responses were 'Somewhat agree' and 'Strongly agree', see Figures 4.14 –4.20.

Question 6

The responses of students to this question were mostly that they think the use of Arabic/French would help 'fairly much' in learning EST: with a rate of 56.4%, see Figure 4.22. This reduces the credibility of the conclusions drawn previously on the

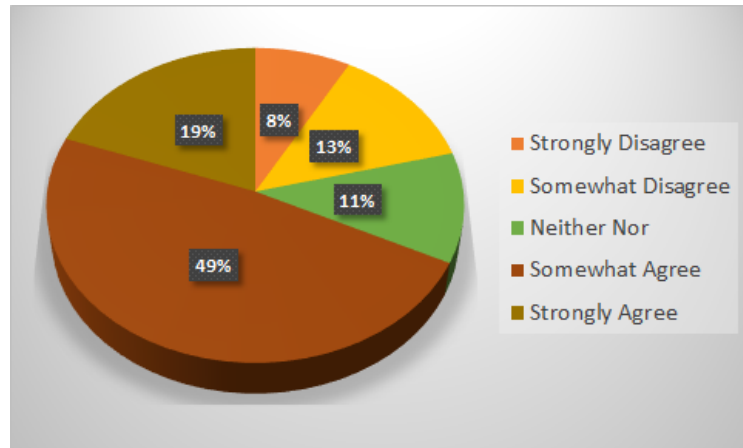


Figure 4.14: Students' Responses to the Statement: 'to define new vocabulary items'

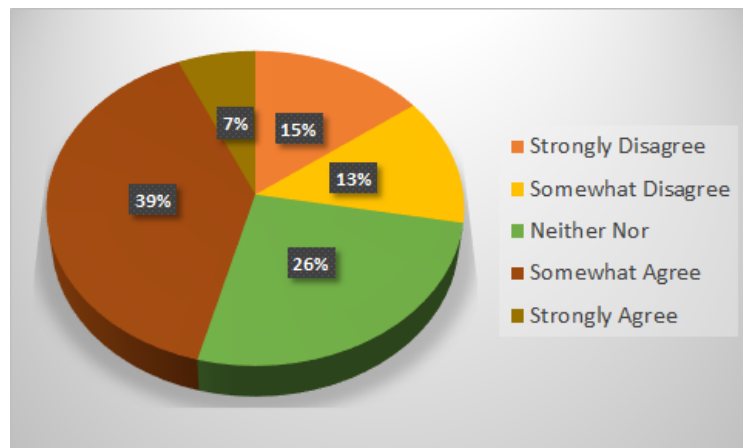


Figure 4.15: Students' Responses to the Statement: 'to practise the use of some phrases and expressions'

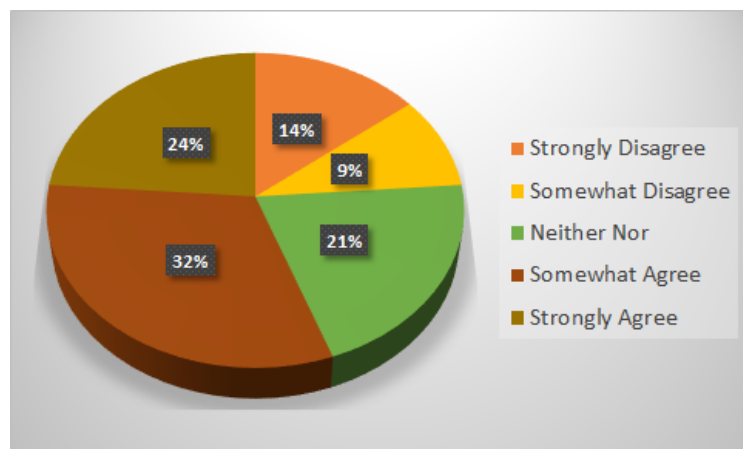


Figure 4.16: Students' Responses to the Statement: 'to explain complex grammar points'

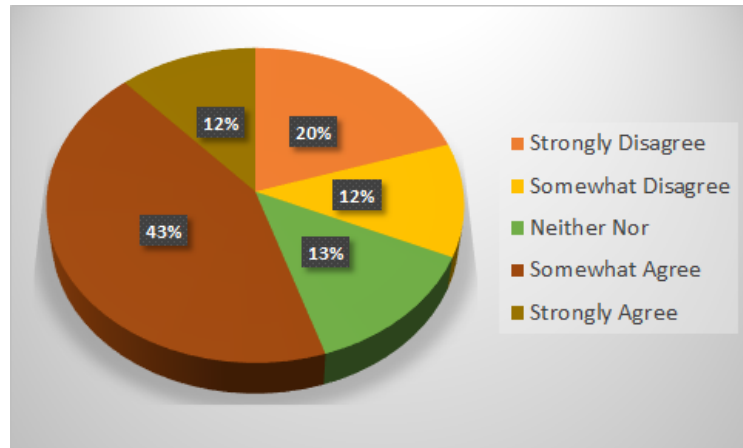


Figure 4.17: Students' Responses to the Statement: 'to explain different concepts or ideas'

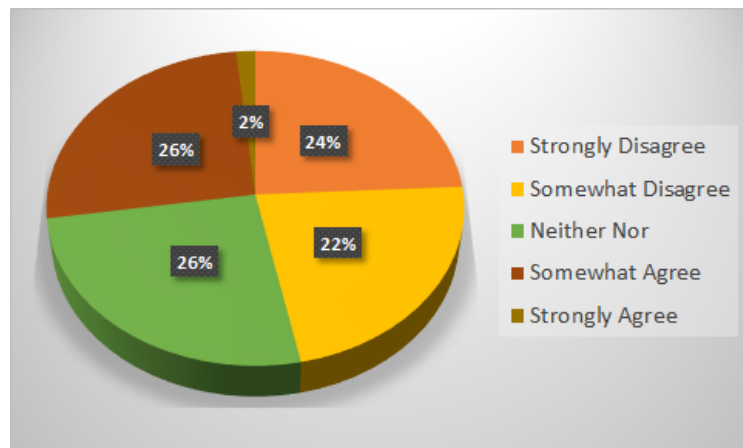


Figure 4.18: Students' Responses to the Statement: 'to give instructions'

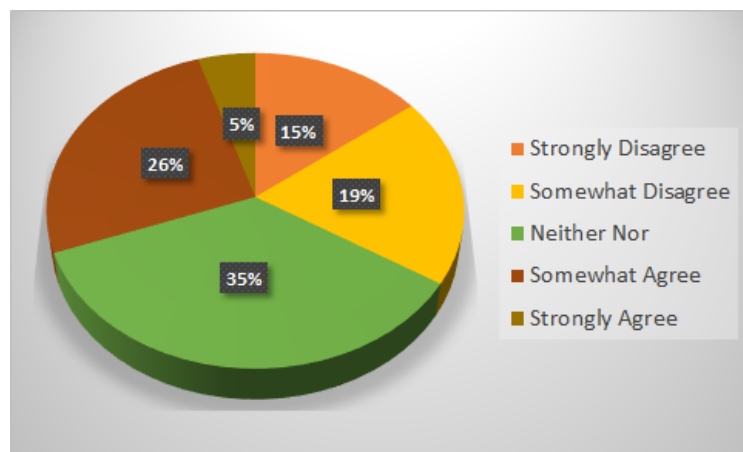


Figure 4.19: Students' Responses to the Statement: 'to give suggestions on how to learn more effectively'

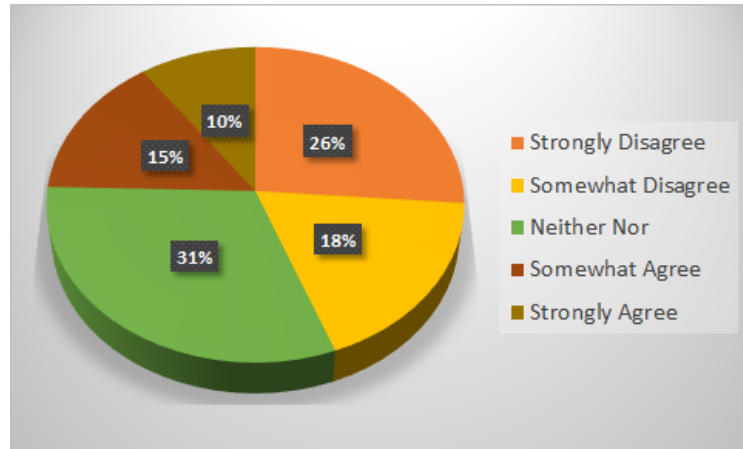


Figure 4.20: Students' Responses to the Statement: 'to summarise materials already covered'

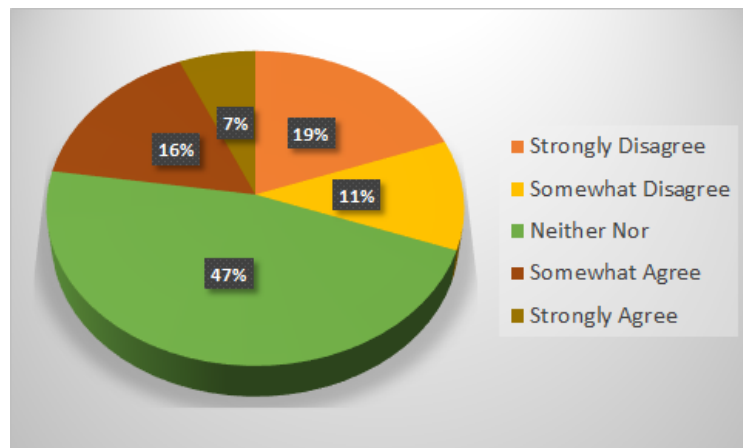


Figure 4.21: Students' Responses to the Statement: 'to joke around inside the classroom'

basis of the responses to Questions 3 and 5. A possible cause of such a contradiction is that the students might have lost focus, mainly due to the length of the questionnaire.

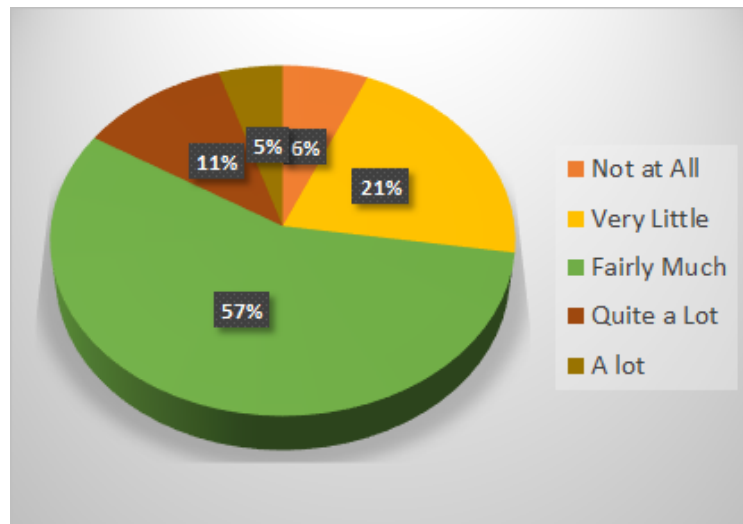


Figure 4.22: Students' Responses to the Question 'How much do you think the use of French or Arabic in the classroom helps you to learn English?'

Question 7

When asked to choose a language to be used side by side with English in EST classrooms, most students chose 'French', Figure 4.23. This comes with concordance to their response to Question 2 above.

Question 8

Most students, judged that 'Arabic/French should be used' sometimes or not at all, with rates corresponding to 59.67% and 9.67 %, respectively, Figure 4.24.

Question 9

As for the reading texts translation, most students disagreed by choosing the options 'None' and 'Sometimes', with rates equal to 30.64% and 35.48%, respectively, Figure 4.25.

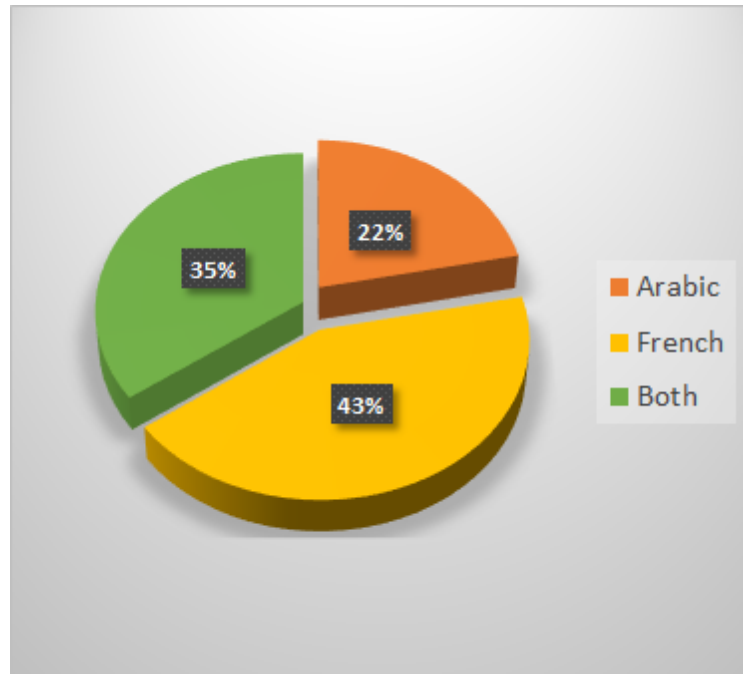


Figure 4.23: Students' Responses to the Question 'If another language, but English, is to be used during EST classes, which one do you prefer to be used?'

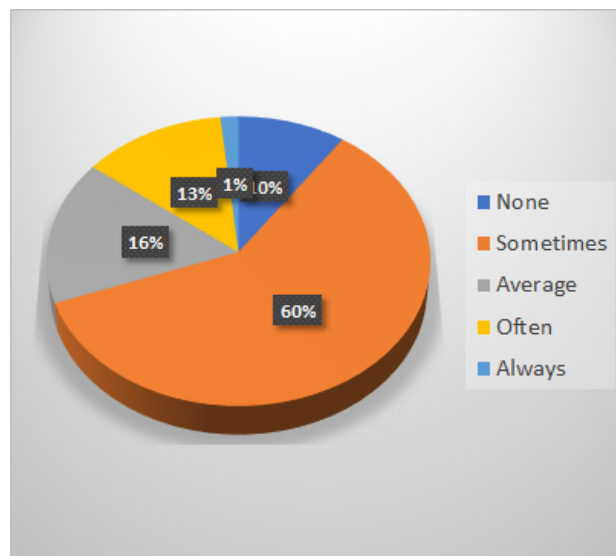


Figure 4.24: Students' Responses to the Question 'How often do you think Arabic/French should be used in the classroom?'

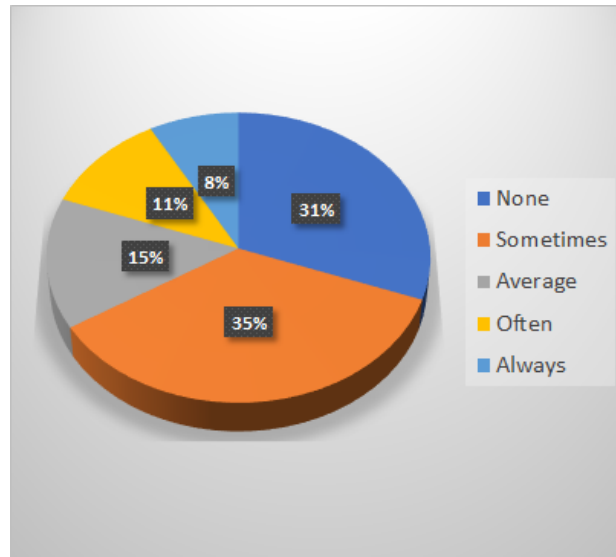


Figure 4.25: Students' Responses to the Question 'How often do you think the reading texts should be translated into Arabic/French?'

Question 10

Concerning the language preferred by the students, if translation of the text material takes place, the rates obtained were: 28,33% for 'into Arabic', 33,33% for 'into French', and 38,33% for the use of 'Both languages', Figure 4.26.

Question 11

The majority of students, through a rate of 59,67% confirm taking advantage of using the silent translation strategy to deal with activities of the EST sessions, see Figure 4.27.

Question 12

41,93% of students declared that they 'sometimes' use a bilingual dictionary when dealing with the tasks covered in the EST classroom, Figure 4.28.

Question 13

For what concerns the direction of translation adopted by the subjects, 47,54% of them answered that they find it easier to translate from English into a TL, while

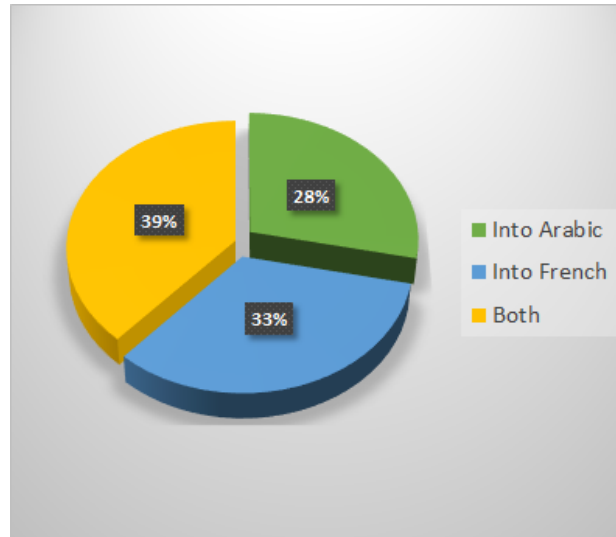


Figure 4.26: Students' Responses to the Question 'Do you prefer that the reading text be translated?'

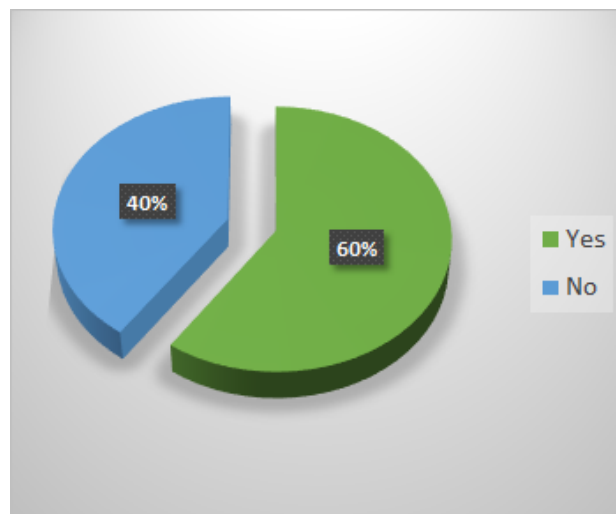


Figure 4.27: Students' Responses to the Question 'When doing exercises during EST sessions, do you mentally translate from Arabic/French into English?'

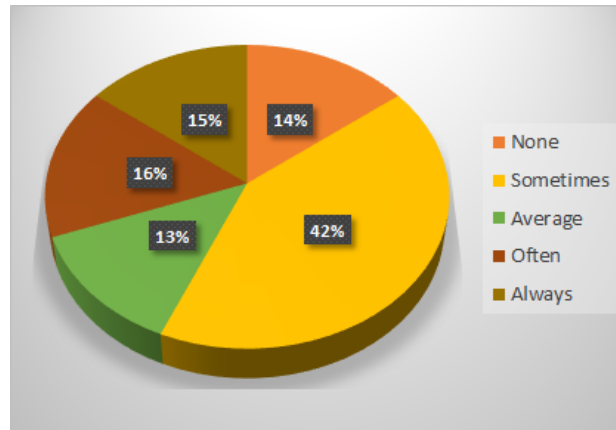


Figure 4.28: Students' Attitudes to the Statement 'While reading professional texts I use a bilingual dictionary to translate unknown words.'

52,45% stated the opposite, Figure 4.29.

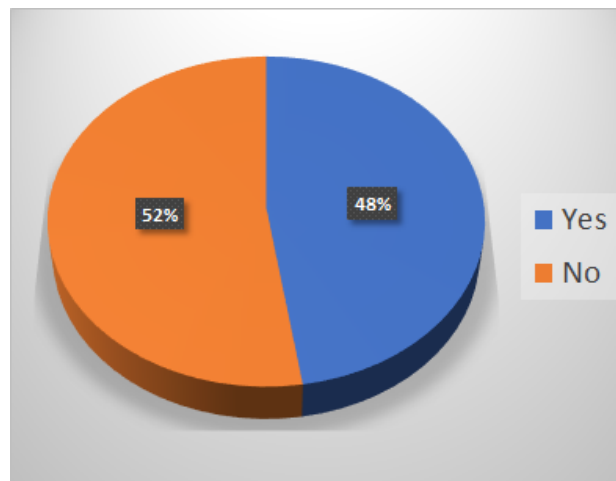


Figure 4.29: Students' Attitudes to the Statement 'In EST vocabulary tests, it is easier for me to translate terms from English than into English'

Question 14

With regard to the mental-condition translation when listening activities are put into practice, about half of the students, 51,61%, confessed their concernedness, see Figure 4.30.

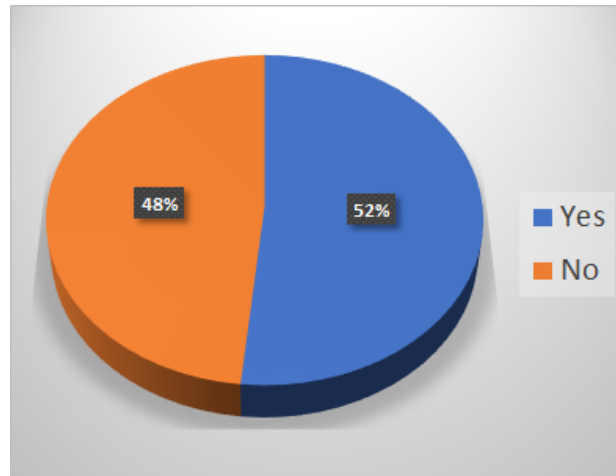


Figure 4.30: Students' Attitudes to the Statement 'In listening activities, I often mentally translate what I hear'

Question 15

30,64% claimed they had had a bad experience as a result of the ban of using Arabic/French in EFL classrooms, Figure 4.31.

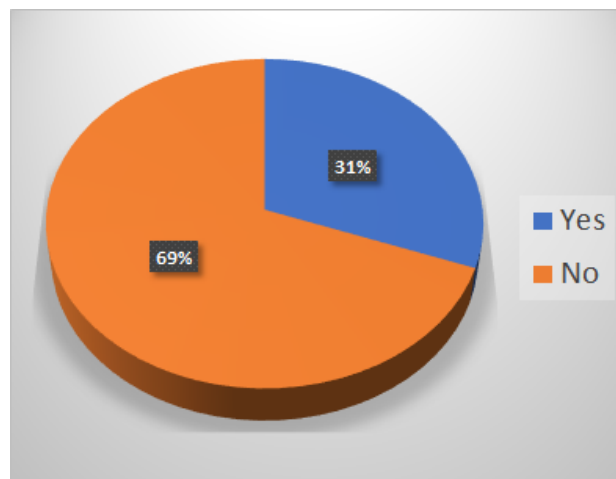


Figure 4.31: Students' Attitudes to the Statement 'Have you had any bad experience with the ban of using Arabic/French in pre-university EFL classes?'

Question 16

The students evaluation of the degree of damage resulting from banning the use of L1/L2 in EFL classrooms gave as average: 4.072 out of 10. This value may be

seen as pertinent since internal/external motivation shapes a key factor in foreign language learning.

Question 17

Finally, the students responded to the question related to which part is preferred by students to be targeted by translation activities. They mostly agreed about writing, with 65,07%, then Grammar, with 57,14%; finally comes vocabulary, with 41,26%, Figures 4.32–4.34.

All in all, one could state that the obtained results confirm that the overall attitudes of EST students towards the use of the MT/translation, or even any other language understood better than English, during the EST classes are positive. Moreover, the preferred language to be used side by side with English is French. However, students generally disbelieved in the usefulness of the teacher speaking other languages but English in EST classrooms.

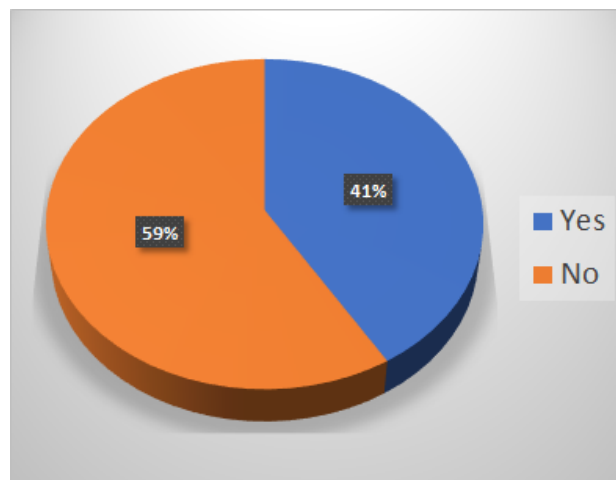


Figure 4.32: Students' Attitudes towards the Use of Translation for Vocabulary Learning

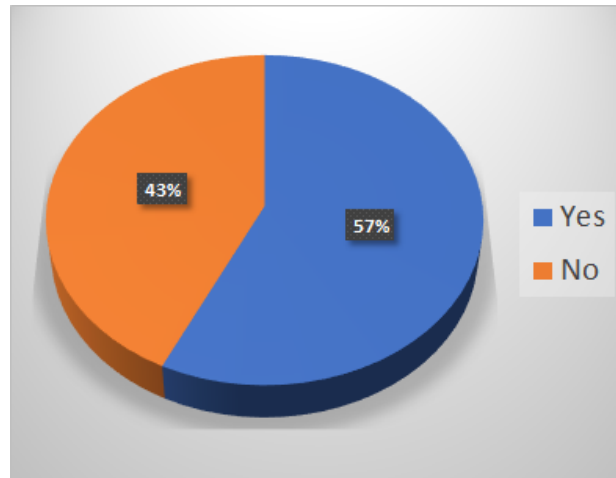


Figure 4.33: Students' Attitudes towards the Use of Translation for Grammar Learning

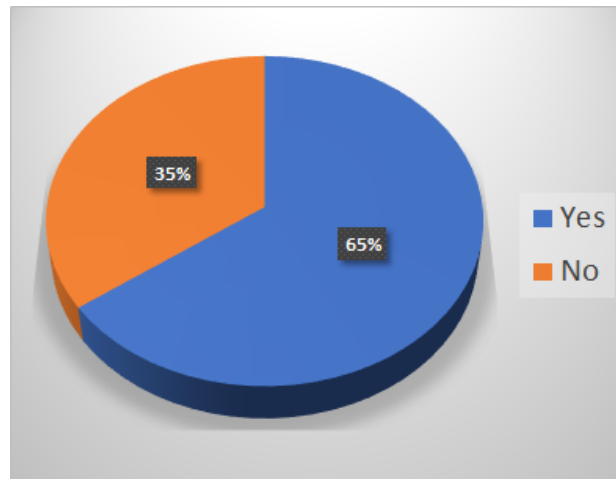


Figure 4.34: Students' Attitudes towards the Use of Translation for Writing Learning

Conclusion

This chapter presented the second contribution of this research. The attitudes of the EST students towards the use of the MT were investigated. We started from the hypothesis that the students had positive attitudes towards the use of their mother tongue, or any other language they understand better than English, during their EST classes. The subjects of our study were Master 1 students who specialised in computer sciences. A questionnaire was devised and distributed to 63 students.

Overall, we found that the respondents had positive attitudes towards the use of the MT in EST classrooms. They were relatively more positive to the use of French, the language of study of subjects. Yet, 80% of the participants stated that they were against the use of their teachers of other languages but English. From this, we can confirm the main hypothesis of this second contribution: EST students at the NTIC Faculty prefer the MT to be used in the classroom; but they think it would be better if the teacher keeps using English only.

In the next chapter, some pedagogical implications issued from the two main contributions of this thesis are presented. In addition, some recommendations, mainly in the form of how the MT/translation could be effectively used in an EST classroom, are framed.

Pedagogical Implications: The MT and Translation in an Algerian EST Classroom

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Introduction

The findings of our two contributions, in addition to the works of the state of the art, have intrigued some thoughts about the pedagogical implications and possible uses of L1/translation in EST classrooms. This chapter is hence composed of two main parts. The first part explores how the use of L1/translation in EFL/EST has been implemented, and discusses the applicability of their recommendations to the Algerian EST classrooms. In the second part, we try to devise a general methodology to include the L1 or translation activities in EST classrooms.

In the critical review of previous works, we aim to focus more on whether the findings reported there are applicable in an Algerian EST classroom. To do so, a set of criteria are checked. We try mainly to answer two questions for every neighbour work:

- (1) Are the findings, or the drawn conclusions, of that work valid?
- (2) How far are the findings of the work applicable in an Algerian EST classroom?

It is worth to mention here that we also treat some of the works targeting EFL with translation as a pedagogical tool, but we try to contextualise them for an EST frame. However, more focus is set on the ESP/EST works. As far as the methodology we propose to exploit our findings in the Algerian EST classroom, we do not provide a process in which the phases are well defined, we rather give it in the form of some recommendations.

5.1 Previous Works on the Use of MT/Translation in EFL Classrooms: A Critical Review

As seen in Chapter 2, many works have been proposed in the literature to study the usefulness of L1/translation in EFL classrooms. To have a general view of the kind of contributions in this context and their perspectives, an overall analysis has been conducted in this chapter according to the following criteria:

- Are the findings of these works applicable to an EST, instead of an EFL, context?
- Would EST learners at the Algerian Universities benefit from these findings?
- What adaptations are needed to make these works' findings applicable to the Algerian EST learners?

Table 5.1 summarises this analysis. The tabular form was preferred over a set of connected prose for improving readability. As seen from the table, for each work are presented:

- The contribution(s) presented in the reference;
- The findings reported in the reference with regard to MT/translation use in EFL classrooms;
- Our observations, the last column of the table, with regard to its appropriateness to be adopted for an Algerian EST context; we try here to answer the just mentioned questions.

On the whole, 17 works are reviewed. A perception on how each work may be exploited in the Algerian, or at least in the NTIC Faculty, EST context is exposed.

Table 5.1: A Review of Works That Studied the Use of MT/Translation in the EFL Classroom

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty in Constantine 2 University
[Liu 2008]	Investigated the effect of L1 on L2 vocabulary.	(1) Proper application of L1 facilitates the memorisation of new words. (2) Most subjects welcomed the bilingual method. (3) L1 should not be rejected from EFL classrooms.	The findings are intriguing since motivation is targeted, but one should be careful with whether they also apply to translation as activity. The subjects of that study were also EST learners, so those findings would help in the context of the present research.
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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[AlAsmari 2014]	Studied Teachers' Perceptions about the use of the MT in the EFL classroom; Focused on a Saudi context and took Gender into consideration.	Found that (1) EFL teachers at Saudi universities have positive attitudes towards the use of the MT in EFL classrooms (2) Male and female teachers have not had the same perception of the role of the MT for EFL.	This has two links to the Algerian EST context: Arabic is also the mother tongue of the subjects of our study, and the fact that attitudes are positive reinforces the attitudes-related findings we presented in the fourth chapter of this thesis.
[Holthouse 2006]	Investigated the role of the MT for EFL learning in the context of Japanese universities.	(1) Students find it hard to take the English-only class seriously (2) Native-speaking teachers should start allowing the MT in EFL classrooms.	Adopting these recommendations in the classes in the NTIC Faculty would be easier, where there are virtually no native-speaking EST practitioners; the teachers and students share the same mother tongue.
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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Bazani 2019]	Gave a chronological view of positions and attitudes towards the use of translation in L2 classrooms.	It is relatively a descriptive work, no experimental study is conducted.	No clear <i>direct</i> application to the subjects of our study, EST learners at NTIC Faculty; mainly because of the theoretical nature of the book/chapter.
[Jancčová 2010]	Gave a synthetic argumentation on the use of translation for FL learning.	(1) The theoretical analysis proved the positive role of translation in FL learning; (2) Many practical works could be implemented on the basis of the theoretical works given in the paper.	Stressing the promising perspectives of research about proposing translation-based methods and activities to enhance EFL learning guides us to believe more in the fruitfulness of the contributions presented in our thesis.
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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Joshi 2019]	Explored the opportunities and ways translation could help educators to strengthen their language teaching initiatives.	(1) Translation may rejuvenate the learners' zeal for learning. When used rightly, (2) Translation can help the learners develop multiple abilities along with the linguistic competence.	The aspect of 'learners' zeal for learning' is key especially in an EST context; an interesting point is that among the points to be dealt with is developing both speciality-related knowledge. Improving Arabic could also be one of the benefits of using translation activities.
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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Jancčová 2010]	Studied the role of both the MT and translation in EFL teaching: The theoretical part synthesises works related to attitudes to L1/translation use in EFL classrooms; the practical part applied the information from the theoretical part to the Czech educational environment.	(1) Challenging translation activities enhances learners' motivation, (2) The open translation proved to be good for reading comprehension of longer texts while the exact translation seemed to be more appropriate for shorter texts focusing on some grammar items.	The link to reading comprehension is also important because the main skill the EST learners of NTIC need to develop is reading; they need to read papers especially for their graduation projects.
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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Wharton 2007]	(1) Investigated the use of L1/translation in EFL with more focus on SLA acquisition, (2) Particularly implemented a translation-studying experiment	Found that: (1) Students enjoyed and were stimulated by the translation task; (2) students could learn that they would be able to express things differently in the TL.	The communicative nature of language and enhancing expressiveness abilities would help EST students in NTIC Faculty carrying worries or phobia of learning English.
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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Lo 2016]	Studied how to use translation tasks to: (1) engender language related discussions in class and (2) improve students' mastery in grammar and lexis.	When translation was adopted, the students: (1) showed a higher level of involvement in L2 class discussions, (2) made more lexical and grammatical improvements in their writing, and (3) had more positive views on the use of translation in L2 classrooms.	One could inspire from the implemented methodology to boost the students implication and develop the learners' grammar and vocabulary.
[Al Amri and Abdul-Raof 2014]	Proposed a methodological approach for using translation as a pedagogical tool in the foreign language classroom.	Translation when made recourse to in a proper language learning setting and within a well-set framework, can prove very useful.	We could (1) study the applicability of the methodology proposed in that work on an EST context, and then (2) Adapt it to the Algerian EST learners.

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Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Peverati 2015]	Investigated how translation as a pedagogical tool is perceived in EFL classrooms, the focus was on a European context.	(1) Proponents overly used it; (2) Opponents are strictly against it, they still believe it should be banned in EFL classrooms.	The no-clear decisive nature of positions towards translation use in that study prevents us from exploiting it in a practical way.
[Rommel and Tonell 2017]	Studied the MT use in EFL classrooms, they focused on children learners through analysing a questionnaire filled by teachers.	(1) Most of teachers involved believe that L1 can be used as a facilitator in the classroom; (2) Although the majority of institutions require the use of L2 only, teachers use L1 in their classes.	Despite the positive attitudes of learners and teachers towards translation, the fact that the subjects are children makes us be cautious about adapting its findings to the present work subjects of study: <i>adults</i> oriented EST setting.
			Continued on the next page

Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Joshi 2015]	Conducted a synthetic study of opinions about the integration of translation as a tool to EFL teaching.	If used as a tool to offer the learners exposure to a new domain of knowledge, translation can be fruitful.	This paper well considers the fact that translation helps in developing the four language skills, this means it would be of great interest to Algerian EST learners.
[Khatai 2011]	Studied the use of translation in a Nepalese EFL context.	Presented some ‘simple and applicable’ (as claimed by the authors) strategies to enhance EFL learning.	We could try to reimplement their approach in the EST context of the Algerian universities.
[Kayaoğlu 2012]	Explored theoretical and practical positions of English teachers in the use of MT in their class instructions.	A great majority of the teachers were found to take a practical and pragmatic position in the use of L1 instead of adhering to popular beliefs on this topic.	What is interesting in this particular work is that it considers the case of teachers. It is a fact that the teachers’ implication in such decisions should be a very important factor to consider.
			Continued on the next page

Table 5.1 – Continued from the previous page

Reference	Contribution	Findings	Suitability to EST Learners at the NTIC Faculty
[Timor 2012]	Made focused analysis of the teacher use of the MT in the FL classroom.	Teachers' overall attitude towards MT use in FL classrooms was positive.	This reinforces the idea that both teachers and learners generally agree with the translation use in EFL.
[Mansor 2017]	Studied the use of MT in a Libyan higher education context; carried out three studies.	<i>Lack of teacher training, proficiency level in the TL and course content</i> are the reasons to an overall high use of L1 (Arabic) among teachers and students.	The MT of the subject of that study is Arabic, like the case of EST learners of the NTIC Faculty, encourages us to believe its finding are relatively applicable.

5.2 Previous Works on the Use of MT/Translation in ESP/EST Classrooms: A Critical Review

The previous section reviewed some works supporting the findings got from our contribution with regard to the use of L1/translation in EFL classrooms. However, an important question rises automatically: ‘To which extent the claims supporting L1/translation use for English learning are valid for an EST context?’ In order to respond to this question, we discuss here some of the state-of-the-art works that have EST as area of application of translation. The explored works are also analysed with regard to their relation to the specific case of the EST learners in the NTIC Faculty.

As far as the use of translation with EFL, ESP and EST is concerned, it is found that most works focused on EFL and ESP with a lesser degree, while EST has not been independently considered, maybe because most researchers believe that it is just a sub-branch of ESP. Fortunately, most theoretical and practical findings of ESP-centred research are applicable to an EST context.

On the basis of some theoretical and methodological studies besides classroom observations, Koletnik [2012a] argued for the positive role of translation for ESP teaching; she stated that translation had led to some improvement with the observed students. Basically, the author focused on business formal communications. However, her work did not contain any statistically-validated experimentation, which makes one more cautious about the significance of her findings.

Kavaliauskienė and Kaminskienė [2007] analysed the results of a survey to study the students’ attitudes towards the use of the mother tongue during ESP classes. They concluded that the learners usually rely on their mother tongue to deal with ESP content.

Leonardi [2009] conducted a theoretical analysis of the effect of translation on business ESP learners. She argued that translation helps students to learn

“about problem solving strategies, improve their analytical skills and strengthen their grammatical and lexical competence and performance”. That study, like many other theoretical studies, assumes that ESP learners already have a good level of general English as a result of their previous EFL courses. It is worth to mention, here, that this is not true for Algerian EST learners, more specifically computer science students at Constantine 2 University. Moreover, Leonardi did not support her theoretical ideas with any experimental analysis.

In a similar way, without providing any experimentation, Koletnik [2012b] declared that translation can help in an effective and efficient development on linguistic and communicative skills. She also stressed the fact that this is particularly true at more advanced levels of education.

Reading comprehension, as a crucial task of ESP sessions, was considered by Marzban and Azizi [2013]. The authors used some experimental investigation with 66 high school students to reject the hypothesis that translation has an effect on reading comprehension. The problem in that work is that the authors used a simplistic statistical analysis, a t-test was adopted for a pre-test post-test control experimental group design. Actually, this is not the best way to deal with such a design; an analysis of variance (ANOVA) or mixed model statistics are more appropriate to consider the influence of time (or other hidden factors) on the level of students at English. Additionally, as stated above, those who argued for the use of translation in EFL/ESP classes have made it explicit that the benefits are more likely to occur with advanced learners with a good mastery of general English; this is not generally the case of high school students (subjects of the just-mentioned reference).

We finish this neighbour works exploration with citing the work of Avand [2009], since it is very close to ours. The author of that work implemented an experiment on 57 students of a medicine and nursing programme. Even though he argues for the use of translation and its positive role in ESP, the author, like the above-mentioned

works, ignores the particularity of the test design he opted for, a pre-test post-test control experimental group design. Moreover, two independent variables, not only one as considered by the author, should have been taken into account: time and treatment. Thus, any conclusions about the role of translation in aiding students to comprehend ESP texts would be partially invalid.

On the whole, the particularity of the first contribution of our thesis when compared to previous works can be summarised in the following points:

- (1) Our contribution consists of studying the effect of translation on EST learners, rather than general English learners, or even ESP learners.
- (2) The students we deal with have relatively low to beginners level of English proficiency. This may be the *under-explored* reason that prevented previous, and even current, attempts to implement EST/ESP courses result in naught. Another issue related to this point is that, according to many teachers' classroom observations, the students do not have a clear idea on their level of English. In simple words, they think, as seen in Chapter 4, they have intermediate to good level, while the reality is that most of them are beginners.
- (3) Another particularity of the subjects of our study is that they use French, the first foreign language they learned, as a medium of communication in all the other modules, especially in reading and writing. They use English only in EST sessions.
- (4) There is no well-established ESP, neither EFL, course content to be dealt with in most Algerian EST learning contexts; this is not the case for other works in most countries in which ESP was implemented. As seen in Chapter 1, one important step toward the implementation of ESP is needs analysis, in which content is well studied and established.
- (5) More importantly, the conclusions drawn from the present study; that given in

Chapter 3, are based on an adequate statistical analysis, which considers not only the effect of time as another independent variable, but also other hidden variables that could affect the experimental analysis.

5.3 Towards a Methodology for Using L1/Translation in EST Classrooms

The methodology proposed in this section aims at helping EST course designers implement any future exploitation of this work findings, i.e. the use of the mother tongue or translation activities to improve EST learning abilities.

5.3.1 Which Language and Which Direction of Translation

A first essential question to be answered in the context of using translation in the NTIC Faculty EST classrooms is: What pair of languages should it be? English-and-French or English-and-Arabic? It is not easy to decide since:

- Since, Arabic is the mother tongue, it is supposed to be easier to be understood than French. However, as well seen from the questionnaire analysed in Chapter 4, the subjects of this study prefer French over Arabic as a supporting language during EST classes.
- Formal Arabic is not mastered by the NTIC Faculty students, it is even underestimated as a language to be used in science and technology.
- There is a non-negligible portion of students who have serious issues with comprehending French. They even feel some 'handicap' once the teacher starts speaking French.

To overcome this problem, a dialectal version of Arabic has been adopted by the teacher in the form of quick/draft/on-the-fly translation to help students cope with the explanation of the presented material. IT is a fact that informal language is overlooked by many teachers at Algerian universities, but we do not agree from banning the use of informal Arabic for two main reasons:

- (1) In the field of linguistics, a truth is adopted; no language is better than another, no language variety is better than another. In fact, the standard variety is just chosen to be representative of all varieties of that language. So, the use of what is known to be ‘dialectal Arabic’ has the same value to using ‘formal Arabic’.
- (2) The Arabic variety choice should not be problematic because the language we are aiming at mastering in EST classrooms is English. If one wants to raise the formality of the used Arabic, this will break the EST development, it is purely a matter of focus.

As far as the direction of translation is concerned, no decision could be done. The question included in the questionnaire contained a question about what direction of translation is *easier*. So, we cannot conclude about the *preferred* direction of translation. In addition, the rates given there are both about half of the population of study.

Fortunately, classroom observations¹ are there to help with this issue. It has been observed that the multilingualism that may exist in the EST sessions could be well exploited according to some configuration. It was mainly observed that:

- The students prefer translation from English into French in two contexts: (1) when a term/expression needs to be understood, especially in the case of technical terms; (2) in the context of translation activities: For example, when they are asked to translate abstracts/statements of technical texts.
- Whenever in-class communication takes place, the preferred language is Arabic. This may be justified that a key factor in communication is ‘self-confidence’, as already seen in Chapter 2, the use of the mother tongue offers a sense of security for the learners as Butzkamm [2003:36] argues.

¹They have been observations of the teacher who is the author of this thesis.

- Arabic and French should be used separately in the EST classroom, when exploited of course. This, as observed, maintains the idea that the three languages are not the same.
- Translation or Arabic/French use when kept at minimum has motivated students to spend more effort in trying to learn new ways to express themselves in English. On the other hand, the first attempts in which translation/L1 was overused resulted in a chaotic situation. This reinforces the state-of-the-art views mentioned in the second chapter.

5.3.2 Translation as an Activity for Algerian EST Learners

To implement pedagogical translation in our Algerian EST context, two things need to be provided:

- (1) a set of texts/passages that would be used as material to be dealt with when translation activities take place;
- (2) the process or at least a description of the activity. We present here a tentative response to these two requirements.

A. Text Material

The text to be treated in the EST classroom needs to be carefully chosen and based on well-carried needs analysis phase. As already mentioned, no serious consideration for devising EST content has been adopted by the affiliation of the subjects under study. Hence, we propose here some text material that helps in two aspects:

- (1) Providing some material for EST teachers. This material would be useful particularly to computer science learners at our Algerian Universities.
- (2) Such a material may be the kernel of any future attempts to compose a *computer*

science bilingual dictionary.

Appendix 4 presents some of the texts we suggest be used as EST reading material. The particularity of these texts, compared with those being dealt with now, is that they are more focused in terms of specificity of content. In fact, the currently used texts are either very generic, talking about the components of computers, or have nothing to do with computer science at all; e.g. texts about speech organs.

The proposed texts, on the other hand, discuss relatively advanced concepts in computer science. Texts talking about *object-oriented databases* and *Software Engineering*, for instance, are likely to be of interest to computing students, more precisely at Master 1 level, who will write their graduation project in the year that follows. Actually, our EST students are always complaining about the fact that they need to read articles in English to accomplish the tasks requested by their supervisors, however, they state it clearly, they do not understand even the core content of these articles.

B. The Activities

Based on the findings of the state-of-the-art works and our in-class observations, a progressive method to involve translation is proposed here.

Step One: Vocabulary Focus Step. In this step, a very simple use of the MT² takes place to enrich the students lexical repertoire. This step could take from 10 to 15 minutes at the beginning of the session. IN this phase, the teacher could ask the students to try to translate some technical or semi-technical terms, with more focus on the essential terms required to the overall comprehension of the text. This, we believe, would greatly help in avoiding the students' frustration.

²French could be used if the teacher judges it is more beneficial than Arabic. Appendix 5 supports this idea.

Step Two: Some Grammar. As a second step, the teacher may ask students to put the just-translated terms in context. It goes without saying that this task should be implemented in a progressive way. For instance, in the first sessions, the students can be asked to use only three to four terms among the keywords of the text to be put in simple short sentences. Later on, the students may be asked to talk in three to four-sentence paragraphs about one of these keywords; and so on.

In parallel to this task, there will be a need to teach students about the English language grammatical aspects. However, it is to be noted that there is no need here to an exhaustive exploration of the grammatical concept being dealt with. The teacher should be totally aware that this is EST and not EGP. Thus, the communicative competence is targeted.

Step Three: Cohesion and Coherence. In an advanced phase, cohesion and coherence are to be dealt with. This step could be implemented by giving exercises to be prepared at home. Thus, long texts could be treated. It is to be noted here that, as Jancčová [2010] argues, free translation is most appropriate with long texts.

Step Four: Boosting In-class Discussion. After having their translations done, the students could be asked to talk about their produced texts. Of course, here, the students' use of English as means of communication should be prioritised. It is obvious that students do not need to exhaustively discuss the produced texts, some excerpts would suffice, the aim to bear in mind here is learning English, not becoming translation professionals.

Conclusion

In this chapter, was presented the analysis of the qualitative and quantitative findings of our research about the use of translation as aid for EST learners. The aim was to respond to the question: 'How could one get profit from the findings of the present research in an Algerian EST context?'. To do so, an analytical review of

EFL/EST oriented works using L1 translation usefulness as a pedagogical tool was first given. Next, a kernel for a potential design of a method to translation use in EST was proposed. It is worth to mention that this methodology can be seen as a set of recommendations, rather than an exhaustive description of a process.

General Conclusion

In this study, the role of L1/translation in the English for Science and Technology (EST) classroom was investigated. Recently, the mother tongue and translation have found their way to the EFL classroom. However, the EST classroom has its particularity, which means: Not all EFL findings could be directly exploited in an EST context. Thus, we found it useful to study whether the use of translation or L1 would bring a plus to EST learners. As population of study, we targeted first year Master student at the the NTIC Faculty of Constantine 2 University.

As a starting point, we asked the following research questions: (1) Does the use of translation from English into L1, Arabic, or any other language the learners know better than English, for teaching EST improve students' comprehension of the presented material?; (2) "Do EST learners have positive or negative attitudes towards the use of L1/translation in EST classrooms?". Consequently, other sub-questions have emerged:

- (3) If L1/translation was used as a pedagogical tool, what are the students' preferences with respect to the language aspects to be targeted?
- (4) Do students prefer to use Arabic or French as facilitation during EST sessions?
- (5) What are the conclusions that could be drawn with regard to the current situation of EST in the faculty of new technologies of Constantine 2 University?

Two main research hypotheses have resulted:

- (1) "If teachers use the learners' MT or translation when teaching English for science and technology, this would improve the learners' comprehension abilities.";
- (2) "EST learners at the NTIC Faculty of Constantine 2 University have positive

attitudes towards the use of translation/L1 in EST classrooms.”

To check the first hypothesis, a pre-test post-test control experimental group design has been adopted. As far as the second hypothesis is concerned, a questionnaire-based study has been devised.

As findings, the hypotheses formulated in this research have been confirmed. Some methodological recommendations that would help in adapting these findings to an Algerian EST context have also been proposed.

All in all, it has been found that the use of the MT or translation in the Algerian EST classroom is likely to help students improve their linguistic abilities. Further, it has been confirmed that allowing the students to use French, being the language they use in their studies, is positively perceived by EST learners. Moreover, the students judged that the teacher should avoid using Arabic/French in the EST classroom.

The main limitations of this research could be summarised in the following:

- (1) The pedagogical implications offered in Chapter 5 need more than a simple thesis work to be exploitable. Such course-related decisions involve the affiliations offering computing curricula.
- (2) A separate study should be carried out to devise a text content to be especially dealt with in translation activities.
- (3) The students level of English is relatively limited, this makes it useless that they attend an EST course. Besides, they are not aware of their real level of English mastery.
- (4) The English as a module at scientific and technical faculties of Algerian universities is overlooked, this should be corrected.

As suggestions for future research, we plan to:

- (1) Develop the *How* side of research, i.e. respond to the question: ‘How translation

could be used to get the maximum profit from its role as EST course facilitator?’

- (2) Further develop the methodology proposed in Chapter 5 that aims at including translation in EST classrooms.
- (3) Provide the EST teacher with some handouts specifically written for Master 1 computer science students in the NTIC Faculty, in which translation activities are used.

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Appendix 1: Pre-test Used in the Practical Study

This test is devised in the context of a research study. So, we will be very thankful if you could respond to the following questions.

Read the following text carefully then answer the questions.

Object-oriented programming (1) is a type of programming in which programmers define not only the data (2) type of a data structure (3), but also the types of operations (functions) that can be applied to the data structure. In this way, the data structure becomes an object (4) that includes both data and functions. In addition, programmers can create relationships (5) between one object and another. For example, objects can inherit (6) characteristics from other objects.

Before writing code (7) lines in any software (8) development process, it is needed to accomplish two tasks: needs analysis (9) and design (10). In the first task, the developer (11) is needed to analyse the needs of the future clients of the designed (12) system. In other words, the future functionalities of the system are defined in this step. The second task is the most important task in the development process (13). In this phase, the general structure and algorithmic behaviour of the future system are given.

In order to be able to communicate adequately, computer scientists (14) invented a Modelling language allowing them to express the requirements (15), architectures and even behaviour of their systems. This language is abbreviated as UML. Nine diagrams constitute the basic system of notation in this language. However, many other diagrams are being added periodically to this system of notation.

For designing their systems, software developers use several approaches. Recently, a new approach has been adopted by the majority of object oriented developers. It is called the Unified Process (16) (UP). This method is based on UML as a modelling language, and is based on an incremental and iterative process.

Generally speaking, many software systems in use need the storage (17) of data in large quantities to be used later by clients. For this reason, databases (18) are used. The latter are managed by special software systems called DataBase Management Systems (DBMS).

The main used type of database management systems are relational (19) database systems. This type of RDBMS is based on relational algebra (20) as a consistent mathematical theory.

Questions:

1. Provide the meaning of the underlined words.
2. Give the French equivalent of the underlined words.
3. Give the Arabic equivalent of the underlined words.

	Word or expression	Meaning	French equivalent	Arabic equivalent
1				
2				
...				
20				

Appendix 2: Post-test Used in the Practical Study

This test is devised in the context of a research study. So, we will be very thankful if you could respond to the following questions.

Read the following text carefully then answer the questions.

The Internet (1) is, quite literally, a network (2) of networks. It is comprised of ten thousands of interconnected networks spanning the globe. The computers (3) that form the Internet range from huge mainframes in research establishments to modest PCs in people's homes and offices. Despite the recent hype, the Internet is not a new phenomenon. Its roots lie in a collection of computers that were linked together in the 1970s to form the US Department of Defence's communications systems (4). Fearing the consequences of nuclear attack, there was no central computer holding vast amounts of data (5), rather the information was dispersed across thousands of machines. A set of rules, of protocols (6), known as TCP/IP was developed to allow disparate devices (7) to work together. The original network has long since been upgraded and expanded and TCP/IP is now a "de facto" standard.

Large databases (8) can contain hundreds of interrelated files. Fortunately a database management system (9) can shield users from the complex inner workings of the system, providing them with only the information and commands (10) they need to get their jobs done.

The earliest file management (11) programs could only do batch processing (12), which required users to accumulate transactions (13) and feed them into (14) computers in large batches. These batch systems weren't able to provide the kind of immediate feedback we expect today.

Today disk drives, inexpensive memory, and sophisticated software (15) have allowed interactive processing to replace batch processing for most applications. Users can now interact with data through terminals (16), viewing and changing values in real

time. Batch processing is still used for printing periodic bills, invoices, and reports and for making backup copies (17) of data files. But for applications that demand immediacy, such as airline reservations, banking transactions, and the like, interactive, multiuser (18) database systems have taken over.

Many computer scientists believe that the relational data model (19) may be supplanted in the next decade by an object-oriented data model, and that most future databases will be object-oriented databases (20) rather than relational databases. Instead of storing records in tables and hierarchies, object-oriented databases store software objects that contain procedures (or instructions) along with data. Object-oriented databases often are used in conjunction with object-oriented programming languages.

Questions:

1. Provide the meaning of the underlined words.
2. Give the French equivalent of the underlined words.
3. Give the Arabic equivalent of the underlined words.

	Word or expression	Meaning	French equivalent	Arabic equivalent
1				
2				
...				
20				

Appendix 3: Questionnaire Devised for Collecting Students Attitudes Towards the Use of L1 during EST Session

Survey

This survey is devised in the context of a research study. Thus, we would be very thankful if you could help in collecting some student opinions.

Personal Information

1. Age:

2. Gender: ()1. Female ()2. Male

3. Level of mastery of English: 1.() Elementary 2.() Pre-Intermediate 3.() Intermediate

4. Average you got in the first tertiary training programme:

5. Your mark of English exam in the first semester of this year:

6. How do you evaluate your level of English before you come to the university?

()1. Very bad ()2. Bad ()3. Average ()4. Good ()5. Very good

7. How do you evaluate your level of English just before starting the master training programme?

()1. Very bad ()2. Bad ()3. Average ()4. Good ()5. Very good

8. Are you pleased to receive English education in your institution?

()1. Yes ()2. No

9. On a scale from 1 to 10, how much are you satisfied by the EST programme presented in the English lectures of the current year?:

10. On a scale from 1 to 10, could you please evaluate your degree of mastery of French?:

11. On a scale from 1 to 10, could you please evaluate your degree of mastery of Formal Arabic?:

On the use of Arabic or French in EST classroom

1. Should Arabic be used in the EST classroom?

1. Yes 2. No

2. Should French be used in the EST classroom?

1. Yes 2. No

3. If you think Arabic or French use is necessary in the classroom, check the reasons from the following:

- 1. It helps me to understand difficult concepts better
- 2. It helps me to understand the new vocabulary items better
- 3. It helps me to feel at ease, comfortable and less stressed
- 4. I feel less lost
- 5. It helps developing interaction in EST classrooms

4. Do you like your teacher to use Arabic or French in the classroom?

1. Yes 2. Sometimes 3. No

5. When do you think it is necessary to use Arabic/French in the English classroom?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
a) to define new vocabulary items	1	2	3	4	5
b) to practise the use of some phrases and expressions	1	2	3	4	5
c) to explain complex grammar points	1	2	3	4	5
d) to explain different concepts or ideas	1	2	3	4	5
e) to give instructions	1	2	3	4	5
f) to give suggestions on how to learn more effectively	1	2	3	4	5
g) to summarize materials already covered	1	2	3	4	5
h) to joke around inside the classroom	1	2	3	4	5

6. How much do you think the use of French or Arabic in the classroom helps you to learn English?

1. Not at all 2. Very little 3. fairly much 4. Quite a lot 5. A lot

7. If one other language, but English, is to be used during EST classes, which one do you prefer to be used?

Arabic French Both

8. How often do you think Arabic/French should be used in the classroom?

1. None 2. Sometimes 3. Average 4. Often 5. Always

9. How often do you think the reading texts should be translated into Arabic/French?

1. None 2. Sometimes 3. Average 4. Often 5. Always

10. Do you prefer that the reading text be translated?

1. into Arabic 2. into French 3. Neither nor

11. When doing exercises during EST sessions, do you mentally translate from Arabic/French into English?

1. Yes 2. No

12. While reading professional texts I use a bilingual dictionary to translate unknown words.

1. No 2. Sometimes 3. Average 4. Often 5. Always

13. In EST vocabulary tests, it is easier for me to translate terms from English than into English

1. Yes 2. No

14. In listening activities, I often mentally translate what I hear

1. Yes 2. No

15. Have you had any bad experience with the ban of using Arabic/French in pre-university EFL classes?

1. Yes 2. No

16. If yes, give a percentage of the degree of the ban influence on your English linguistic achievements:

17. If Arabic/French is to be used during EST classes, in what part of language learning would you prefer it to be implied in?

- Vocabulary learning
- Grammar learning
- Writing lessons

Appendix 4: Examples of texts to be presented as Material

Text 1

Information Systems

An information system is the group of components that work together to produce meaningful information for individuals and organizations. Components include hardware, software, people, procedures and data. Early information systems did not utilize computers. An example is the library card catalogue, still used in some school and community libraries. The hardware includes cabinets and index cards, the software and procedures involve cataloguing schema (Dewey-Decimal System), the data is the bibliographic information on library holdings, the people are the librarians and the library patrons.

The most central part of the definition of an information system is that it should "work together to produce meaningful information for individuals and organizations." This statement contains three important ideas:

1. Information systems work together - Early information systems could exist in isolated social contexts. There was no need for exchange of information between systems. Therefore, their design was entirely independent. Today there is an increasing need for connectivity and information exchange between information systems to improve their effectiveness and efficiency.
2. Information systems produce meaningful information - An information system must add value to the data it contains by supporting individual or organizational decision making.

3. Information systems exist for people - Information systems were not developed because engineers thought they would be cool. They were developed to support human decision making. Therefore, the success of any information system is defined by its users.

Information systems may be categorized according to their purpose, their scope or their architecture. They are often distinguished by their users and the information they produce.

The scope of an information system has to do with the intended user base. A personal information system (PIS) is intended to support information needs of an individual. Functions often included are an address book, an appointment calendar, a memo pad, and a calculator. A personal data assistant (PDA) is a small computer (typically able to fit in a shirt pocket) that provides a personal information system. The 3Com Palm Pilot is an example. A Group Decision Support System (GDSS) is intended to support task-oriented groups. Other types of information systems focus on organizations or society at large. The YAHOO portal and catalogue on the World Wide Web is an information system whose user base is (potentially) everyone. It has a societal scope.

The architecture of an information system describes how the hardware, software, and data of the system are arranged. The description may be of the information architecture or of the systems architecture. Information architecture refers to the arrangement of processes, services, and data in the system. A simple information architecture may look like the table of contents of a book or a flow chart for a program. Systems architecture refers to the arrangement and physical location of the hardware and software components of the system.

Text 2

Object-Oriented Databases

An object database (also object-oriented database management system) is a database management system in which information is represented in the form of objects as used in object-oriented programming. Object databases are different from relational databases and belong together to the broader database management system. Object databases have been considered since the early 1980s and 1990s. Object databases' main usage is in object-oriented areas. When database capabilities are combined with object-oriented programming language capabilities, the result is an object-oriented database management system (OODBMS). OODBMS allow object-oriented programmers to develop the product, store them as objects, and replicate or modify existing objects to make new objects within the OODBMS. Because the database is integrated with the programming language, the programmer can maintain consistency within one environment, in that both the OODBMS and the programming language will use the same model of representation. Relational DBMS projects, by way of contrast, maintain a clearer division between the database model and the application.

As the usage of web-based technology increases with the implementation of Intranets and extranets, companies have a vested interest in OODBMS to display their complex data. Using a DBMS that has been specifically designed to store data as objects gives an advantage

to those companies that are geared towards multimedia presentation or organizations that utilize computer-aided design (CAD).

Some object-oriented databases are designed to work well with object-oriented programming languages such as Delphi, Ruby, Python, Perl, Java, C#, Visual Basic .NET, C++, Objective-C and Smalltalk; others have their own programming languages. OODBMSs use exactly the same model as object-oriented programming languages.

There are concepts in the relational database model that are similar to those in the object database model. A relation or table in a relational database can be considered to be analogous to a class in an object database. A tuple is similar to an instance of a class but is different in that it has attributes but no behaviors. A column in a tuple is similar to a class attribute except that a column can hold only primitive data types while a class attribute can hold data of any type. Finally, classes have methods which are computationally complete (meaning that general purpose control and computational structures are provided) while relational databases typically do not have computationally complete programming capabilities although some stored procedure languages come close.

Text 3

Particle Swarm Optimization

Particle swarm optimization (PSO) is a population based stochastic optimization technique developed by Dr. Eberhart and Dr. Kennedy in 1995, inspired by social behavior of bird flocking or fish schooling.

PSO shares many similarities with evolutionary computation techniques such as Genetic Algorithms (GA). The system is initialized with a population of random solutions and searches for optima by updating generations. However, unlike GA, PSO has no evolution operators such as crossover and mutation. In PSO, the potential solutions, called particles, fly through the problem space by following the current optimum particles.

Each particle keeps track of its coordinates in the problem space which are associated with the best solution (fitness) it has achieved so far. (The fitness value is also stored.) This value is called *pbest*. Another "best" value that is tracked by the particle swarm optimizer is the best value, obtained so far by any particle in the neighbors of the particle. This location is called *lbest*. when a particle takes all the population as its topological neighbors, the best value is a global best and is called *gbest*.

The particle swarm optimization concept consists of, at each time step, changing the velocity of (accelerating) each particle toward its *pbest* and *lbest* locations (local version of PSO). Acceleration is weighted by a random term, with separate random numbers being generated for acceleration toward *pbest* and *lbest* locations.

In past several years, PSO has been successfully applied in many research and application areas. It is demonstrated that PSO gets better results in a faster, cheaper way compared with other methods.

Another reason that PSO is attractive is that there are few parameters to adjust. One version, with slight variations, works well in a wide variety of applications. Particle swarm optimization has been used for approaches that can be used across a wide range of applications, as well as for specific applications focused on a specific requirement.

Appendix 5: Using Translation as a Pedagogical Tool

This is a sample of students' responses to some homework in which they have been asked to search technical terms and concepts in any sub-area, of their choice, of computer science. They have also been required to provide:

- The English term
- The French Equivalent
- The Arabic Equivalent

In addition, we asked them to provide the definition in the three languages: English, Arabic and French. The responses were very rich and relatively long, so it is impractical to put the whole response here, we just give some excerpts.

From these excerpts the following conclusions could be drawn:

- The students did not make a big effort in providing the accurate definition in Arabic.
- The definitions offered in French have been more accurate than those provided in Arabic.
- The definitions given in English are so long.
- The Arabic terms, relatively accurate, may reflect the effort spent, and so the motivation of students.
- Most Students chose Networking as subfield to be explored. This leads to the question: 'Why do not chose what interests the students for text material design?'.

English word	French word	Arabic word	English definition	French definition	Arabic definition
Access Method	Méthode d'accès	طريقة الوصول	The type of Media Access Control method that a node uses to gain control of a network.	Décrit la façon dont le réseau arbitre les communications des différentes stations sur le câble : ordre, temps de parole, organisation des messages. Elle dépend étroitement de la topologie et donc de l'organisation spatiale des stations les unes par rapport aux autres. La méthode d'accès est essentiellement matérialisée dans les cartes d'interfaces, qui connectent les stations au câble	طريقة الوصول تعرف بأنها طريقة تسمح لعدة قنوات بالتشارك في نفس الوسط الفيزيائي والإرسال والاستقبال من خلال هذا الوسط وأيضا التشارك في مساحة الوسط.
Adapter	adaptateur	مكيف	Hardware that allows a computing device physical access to a network	Matériel qui permet un accès physique du matériel informatique à un réseau	الأجهزة التي تسمح للجهاز الكمبيوتر الوصول الفعلي للشبكة.
Address	Adresse	العنوان	A numerical designation that uniquely refers to a specific communication entity	Signe ou nombre indiquant un emplacement dans la mémoire D'un ordinateur	علامة رقمية تشير إلى موقع في الذاكرة على جهاز الكمبيوتر
ADSL	ADSL	خط الهاتف الرقمي للاتصالات	Asymmetric Digital Subscriber Line .A new technology that allows more data to be sent over existing copper telephone lines. ADSL supports data rates of from 1.5 to 9 Mbps when receiving data (known	Asymetric Digital Subscriber Line, type de liaison haute vitesse	شكل من أشكال خطوط الاشتراك الرقمية، وهي تقنية تبادل البيانات تقوم بنقل البيانات من خلال خطوط الهاتف النحاسية بشكل أسرع من مودم النطاق الصوتي التقليدي وذلك بالاستفادة من الترددات الغير مستخدمة في المكالمات الهاتفية

			as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate).		
Algorithm	Algorithme	خوارزمية	A set of rules and decision structures for actions in a specifically defined set of circumstances	Un ensemble de règles et de structures de décision des actions à un ensemble défini spécifiquement de circonstances	عبارة عن مجموعة من الخطوات الرياضية والمنطقية والمتسلسلة اللازمة لحل مشكلة ما عن طريق تتبع خطوات محددة متسلسلة الوصول في النهاية إلى حل أو ناتج في المرحلة النهائية
Application Layer	Couche d'application	طبقة التطبيقات	Layer 7 of the OSI reference model. This layer provides services to application processes (such as electronic mail, file transfer, and terminal emulation) that are outside of the OSI model. The application layer identifies and establishes the availability of intended communication partners (and the resources required to connect with them), synchronizes cooperating applications, and agreement on procedures for error recovery and control of data	Couche 7 du modèle OSI : Elle permet l'utilisation des logiciels tels que Word, Excell etc.	مرحلة التطبيقات وهي المرحلة التي يتعامل المستخدم فيها مع واجهة البرامج مثل المتصفح وبرنامج نقل الملفات والبريد وغيرها

			integrity. Corresponds roughly with the transaction services layer in the SNA model. See also data link layer, network layer, physical layer, presentation layer, session layer, and transport layer.		
Architecture	Architecture	بنية	The sum total of all of the specifications, protocols and implementations that define a particular networking system.	La somme totale de toutes les spécifications, les protocoles et les mises en œuvre qui définissent un système de réseau particulier	المجموع الكلي لجميع المواصفات والبروتوكولات والتطبيقات التي تحدد نظام شبكة اتصال معينة
asynchronous transmission mode	mode de transmission asynchrone	لا تلازمي	Term describing digital signals that are transmitted without precise clocking. Such signals generally have different frequencies and phase relationships. Asynchronous transmissions usually encapsulate individual characters in control bits (called start and stop bits) that designate the beginning and end of each character.	Terme qui décrit les signaux numériques transmis sans synchronisation précise. En règle générale, ces signaux ont des fréquences et des relations de phases différentes. Les transmissions asynchrones encapsulent habituellement des caractères individuels dans des bits de contrôle (appelés bits de départ et bits d'arrêt) qui indiquent le début et la fin de chaque caractère.	شكل من أشكال اتصالات الكمبيوتر حيث يتم ارسال البيانات في رزم تحتوي على أكثر من حرف واحد. ويعتبر الاتصال المتزامن أسرع من الاتصال غير المتزامن بسبب عدم وجود بت بدء/توقف بين كل حرفين فرديين
backoff	interruption	تَعْطِيل	The (usually random) retransmission delay enforced by contentious MAC	Délai de retransmission (généralement aléatoire) appliqué par des protocoles	

			protocols after a network node with data to transmit determines that the physical medium is already in use.	MAC litigieux une fois qu'un nœud réseau devant transmettre des données a déterminé que le support physique est déjà utilisé.	
Bandwidth	Bande passante	حيز النطاق	In analog communications, the difference between the highest and lowest frequencies available in the band. In digital communications, bandwidth is loosely used to refer to the information-carrying capacity of a network or component of a network.	Est un intervalle de fréquences pour lesquelles l'amplitude de la réponse d'un système correspond à un niveau de référence, donc sur lequel ce système peut être considéré comme 'fiable'. Il s'applique alors pareillement à des systèmes électroniques, de radiodiffusion ou mécanique et acoustique	حيز النطاق يشير الى مجموعة من الترددات التي يمكن ان يمر في قناة ارسال معينة و في الشبكات الرقمية و عادة ما يقاس بالبيت في الثانية
Bit rate	Débit	معدل البث	The rate at which bits are transmitted or received during communication, expressed as the number bits in a given amount of time, usually one second.	Taux de transfert des informations à travers un bus. Retenez surtout que plus le débit est élevé et meilleurs sont les performances.	هي السعة التي يسمح بها لنظام ما لكي ينقل البيانات عبر اتصال ما وتقاس هذه الكمية بوحدة القياس (البايت) كل فترة زمنية

Bridge	Pont	جسر	A Data Link Layer device that limits traffic between two network segments by filtering the data between them based on hardware addresses	Un constituant les moyens de communication qui permettent à un de ses utilisateurs de "sortir" du réseau local pour atteindre d'autres réseaux locaux ou des serveurs distants.	وسائل الاتصال التي تسمح لأحد من مستخدميها "الخروج" من الشبكة المحلية للوصول إلى شبكات الخوادم المحلية أو البعيدة الأخرى.
Broadcast Address	Broadcast(adresse de diffusion)	عنوان البث	Special address reserved for sending a message to all stations. Generally, a broadcast address is a MAC destination address of all ones. Compare with multicast address and unicast address.	1.Adresse Mac particulière FF.FF.FF.FF.FF.FF permettant d'envoyer un message à l'ensemble du réseau. 2.Cette adresse est utilisée pour envoyer un message à toutes les machines d'un réseau. Chaque bit de la partie hôte de l'adresse est fait de 1.	عنوان خاص لإرسال رسالة الى جميع المحطات

A

<p>Access point</p> <p>referred to as a base station and wireless router, an access point is a wireless receiver which enables a user to connect wirelessly to a network or the Internet. This term can refer to both Wi-Fi and Bluetooth devices.</p>	<p>Point d'accès</p> <p>un récepteur sans fil qui permet à un utilisateur de se connecter sans fil à un réseau ou à Internet . Il peut désigner à la fois les appareils Wi-Fi et Bluetooth.</p>	<p>نقطة الاتصال</p> <p>هي نقطة استقبال لاسلكية تسمح للمستخدم الاتصال لاسلكيا إلى شبكة أو شبكة الإنترنت. على سبيل المثال أجهزة واي فاي وبلوتوث</p>
<p>Access Server</p> <p>is a networked computer that is setup and responsible for giving rights to other computers that are not a member of its network.</p>	<p>Serveur d'accès</p> <p>un ordinateur en réseau qui est installé et chargé de donner des droits à d'autres ordinateurs qui ne sont pas membres de son réseau</p>	<p>خادم الوصول</p> <p>خادم الوصول هو جهاز كمبيوتر متصل بالشبكة هو المسؤول عن إعطاء الحقوق إلى أجهزة الكمبيوتر الأخرى التي ليست عضوا في شبكتها</p>
<p>Ad Hoc Network</p> <p>is a wireless network that feature self-configuration and the potential for each wireless node to dynamic forward and receive data.to share data between them without needing a network router, network switch or other network equipment to create the network.</p>	<p>Réseau ad hoc</p> <p>est un réseau sans fil fonction d'auto-configuration et le potentiel de chaque noeud sans fil dynamique vers l'avant et de recevoir des données. partager des données entre eux sans avoir besoin d'un routeur de réseau, le commutateur de réseau ou d'autres équipements de réseau pour créer le réseau.</p>	<p>شبكة ad hoc</p> <p>شبكة لاسلكية التي تتميز التكوين الذاتي والقدرة على كل عقدة لاسلكية إلى حيوية إلى الأمام واستقبال البيانات لتبادل البيانات فيما بينها دون الحاجة إلى جهاز توجيه الشبكة، وتبديل الشبكة أو غيرها من معدات الشبكات لإنشاء شبكة. الأجهزة نفسها بمثابة معدات الشبكات، وإنشاء شبكة بينهما.</p>
<p>Asymmetric Digital Subscriber Line</p> <p>asymmetric because of its two-way bandwidth devoted to the downstream and a small section devoted to upstream transfers</p>	<p>Ligne d'Abonné Numérique Asymétrique</p> <p>asymétrique en raison de sa bande passante dans les deux sens consacrée à l'aval et une petite section consacrée aux transferts en amont</p>	<p>الخط المشترك الرقمي غير المتماثل</p> <p>يعرف بالغير متماثل بسبب عرض النطاق الترددي في اتجاهين المخصصة للمصب وقسم صغير المخصصة لنقل المنبع</p>

<p>Autonomous System</p> <p>portion of a network or group of networks that are controlled by one administrator or group of administrators</p>	<p>Système Autonome</p> <p>une partie d'un réseau ou d'un groupe de réseaux qui sont contrôlés par un administrateur ou d'un groupe d'administrateurs</p>	<p>نظام مستقل</p> <p>هو جزء من شبكة أو مجموعة من الشبكات التي يتم التحكم فيها من قبل مسؤول واحد أو مجموعة من الإداريين</p>
<p>Agent</p> <p>is a part of the system that prepares data for the server or client</p>	<p>Agent</p> <p>est une partie du système qui prépare les données pour le serveur ou le client</p>	<p>وكيل</p> <p>هو جزء من النظام الذي يستعد البيانات لل خادم أو عميل</p>
<p>Asynchronous Transfer Mode</p> <p>ATM is a dedicated-connection switching technology that organizes digital data into 53-byte cell units for transmission.</p>	<p>Mode De Transfert Asynchrone</p> <p>une technologie de commutation dédié à la connexion qui organise les données numériques en unités de cellules de 53 octets pour la transmission.</p>	<p>وضع نقل غير متزامن</p> <p>الاتصال الذي ينظم البيانات الرقمية إلى وحدات الخلية 53 بايت لانتقال العدوى</p>
<p>Address Resolution Protocol</p> <p>used with the IP for mapping a 32-bit Internet Protocol address to a MAC address</p>	<p>Protocole de résolution d'adresse</p> <p>employé avec l'IP pour le mappage d'une adresse de protocole Internet de 32 bits à une adresse MAC</p>	<p>بروتوكول تحليل العنوان</p> <p>يستخدم للتعرف على العنوان الفيزيائي للمتصل عن طريق العنوان المنطقي</p>
B		
<p>Backbone</p> <p>A portion of a computer network that is capable of carrying the majority of traffic on the network at high speeds ; often connects large networks or companies together</p>	<p>L'épine dorsale</p> <p>Une partie d'un réseau informatique qui est capable de transporter la majeure partie du trafic sur le réseau à grande vitesse; relie souvent de grands réseaux ou entreprises ensemble.</p>	<p>العمود الفقري</p> <p>جزء من شبكة الكمبيوتر التي هي قادرة على تحمل معظم حركة المرور على شبكة عالية السرعة يربط الشركات أو شبكات واسعة في كثير من الأحيان معا</p>
<p>Baseband</p> <p>used to describe bandwidth and channels (the signal or system frequency). the highest frequency (measured in hertz) used by the bandwidth, or the upper bound of the bandwidth.</p>	<p>La Bande De Base</p> <p>utilisé pour décrire la largeur de bande et des canaux (le signal ou un système fréquence). la fréquence la plus élevée (mesurée en hertz) utilisé par la bande passante ou la limite supérieure de la bande passante.</p>	<p>القاعدي</p> <p>وصف عرض النطاق الترددي وقنوات (إشارة أو نظام التردد). هو أعلى تردد (تقاس في هيرتز) المستخدمة من قبل عرض النطاق الترددي، أو الحد العلوي من عرض النطاق الترددي.</p>

<p style="text-align: center;">Beowulf</p> <p>describe a network of inexpensive computers or hardware connected together</p>	<p style="text-align: center;">Beowulf</p> <p>décrire un réseau d'ordinateurs bon marché ou matériel connecté ensemble</p>	<p style="text-align: center;">Beowulf</p> <p>وصف شبكة من أجهزة الكمبيوتر غير مكلفة أو الأجهزة المتصلة ببعضها البعض</p>
<p style="text-align: center;">Bind</p> <p>allows a resource to be sent or received. For example, one may bind a request to TCP/IP indicating that it is ready to receive or send information</p>	<p style="text-align: center;">Bind</p> <p>permet une ressource à être envoyé ou reçu. Par exemple, on peut lier une requête TCP / IP indiquant qu'il est prêt à envoyer ou recevoir des informations.</p>	<p style="text-align: center;">Bind</p> <p>يسمح مورد ليتم إرسالها أو تلقيها. على سبيل المثال، TCP / IP يمكن للمرء أن يربط طلب مشيراً إلى أنه على استعداد لاستقبال أو إرسال المعلومات.</p>
<p style="text-align: center;">BitTorrent</p> <p>is a file sharing program that shares files between networked computer users.</p>	<p style="text-align: center;">BitTorrent</p> <p>un programme de partage de fichiers , qui partage des fichiers entre les utilisateurs d'ordinateurs en réseau.</p>	<p style="text-align: center;">تورنت</p> <p>هو برنامج تبادل الملفات التي تشترك الملفات بين مستخدمي أجهزة الكمبيوتر الشبكي.</p>
<p style="text-align: center;">Blade</p> <p>is a hardware component that can be installed into a chassis. It allows for additional functionality, much like an expansion card in a computer, but often at a much bigger scale.</p>	<p style="text-align: center;">Lame</p> <p>un composant matériel qui peut être installé dans un châssis. Il permet des fonctionnalités supplémentaires, un peu comme une carte d'extension dans un ordinateur, mais souvent à un échelle beaucoup plus grande.</p>	<p style="text-align: center;">شفرة</p> <p>عنصر الأجهزة التي يمكن تركيبها في هيكل. لأنها تتيح وظائف إضافية، مثل الكثير من بطاقة التوسع في الكمبيوتر، ولكن في كثير من الأحيان على نطاق أوسع من ذلك بكثير.</p>
<p style="text-align: center;">BOOTstrap</p> <p>a protocol that allows a client to discover certain network information</p>	<p style="text-align: center;">BOOTstrap</p> <p>un protocole qui permet à un client de découvrir certaines informations de réseau</p>	<p style="text-align: center;">BOOTstrap</p> <p>هو البروتوكول الذي يسمح للعميل لاكتشاف شبكة المعلومات معينة. على سبيل المثال، عنوان IP الخاص به</p>
<p style="text-align: center;">bit stuffing</p> <p>is the practice of adding extra information (bits) to a network or telecommunications data stream transmission.</p>	<p style="text-align: center;">bit stuffing</p> <p>la pratique consistant à ajouter des informations supplémentaires (bits) à une transmission de flux de données réseau ou les télécommunications.</p>	<p style="text-align: center;">bit stuffing</p> <p>ممارسة إضافة معلومات إضافية (بت) إلى الشبكة أو الاتصالات السلكية واللاسلكية لنقل البيانات الاتصال.</p>

<p style="text-align: center;">BITNET</p> <p>an U.S. University network founded in 1981 that was first established between the University of New York and the Yale University</p>	<p style="text-align: center;">BITNET</p> <p>un réseau de l'Université américaine fondée en 1981 qui a été d'abord établie entre l'Université de New York et l'Université de Yale.</p>	<p style="text-align: center;">BITNET</p> <p>شبكة الجامعة الأمريكية تأسست في عام 1981. تأسست أول بين جامعة نيويورك وجامعة ييل.</p>
<p style="text-align: center;">Bottleneck</p> <p>happens when too much information enters one source and causes a computer to slow down or become unresponsive.</p>	<p style="text-align: center;">Un goulot d'étranglement</p> <p>se produit lorsque trop d'informations entre une source et amène un ordinateur à ralentir ou à cesser de répondre.</p>	<p style="text-align: center;">Bottleneck</p> <p>يحدث عندما يدخل الكثير من المعلومات مصدر واحد ويؤدي إلى الكمبيوتر لإبطاء أو أن تصبح لا تستجيب.</p>
<p style="text-align: center;">BranchCache</p> <p>a new feature allows computers at a local branch office to cache data from a file or web server on a wide area network (WAN).</p>	<p style="text-align: center;">BranchCache</p> <p>une nouvelle fonctionnalité permet aux ordinateurs à une succursale locale de mettre en cache les données à partir d'un fichier ou d'un serveur Web sur un réseau étendu (WAN).</p>	<p style="text-align: center;">BranchCache</p> <p>ميزة جديدة تسمح لأجهزة الكمبيوتر في مكتب الفرع المحلي لذاكرة التخزين المؤقت البيانات من ملف أو خادم الويب على شبكة واسعة</p>
<p style="text-align: center;">Broadcast Address</p> <p>used to distribute a signal across a network, commonly used for declaring devices and their information on a network.</p>	<p style="text-align: center;">Une Adresse de Diffusion</p> <p>Utiliser pour distribuer un signal à travers un réseau, pour déclarer des périphériques et leur informations dans le réseau</p>	<p style="text-align: center;">Broadcast Address</p> <p>يستعمل لنشر رسالة في الشبكة لتعريف كل الاجهزة المتصلة بها</p>
<p style="text-align: center;">Burst</p> <p>A block of data transmitted all at once. a computer or other computer device may wait for buffer to become full of data or for a specific time before bursting the data to another location.</p>	<p style="text-align: center;">Éclater</p> <p>Un bloc de données transmis à la fois.</p>	<p style="text-align: center;">انفجار</p> <p>كتلة من البيانات تنتقل في كل مرة</p>

C		
Cisco Certified Network Associate	Cisco Certified Network Associate	Cisco Certified Network Associate
is a certification that indicates a foundation in and apprentice knowledge of networking for the small office/home office market.	une certification qui indique une fondation et une connaissance apprenti de mise en réseau pour le marché du petit Bureau	هي شهادة أن يشير أساسا في ومعرفة المتدرب من الشبكات للشركات الصغيرة سوق المكاتب
Chernobyl packet	Paquet de Tchernobyl	حزمة تشيرنوبيل
induces a condition known as a network storm or network meltdown, sometimes referred to as broadcast radiation.	induit une condition connue comme une tempête de réseau ou effondrement du réseau, parfois désigné sous le rayonnement de diffusion.	يؤدي الى حالة تعرف باسم عاصفة الشبكة أو انهيار الشبكة، التي يشار إليها أحيانا إشعاع البث
Cloud computing	Cloud computing	الحوسبة السحابية
describe services provided over a network by a collection of remote servers. provides massive, distributed storage and processing power, which can be accessed by any Internet-connected device running a web browser.	décrire les services fournis sur un réseau par un ensemble de serveurs distants; fournit des massifs, le stockage distribué et la puissance de traitement, qui peut être consulté par tout dispositif connecté à Internet en cours d'exécution d'un navigateur Web.	وصف الخدمات المقدمة عبر شبكة اتصال من قبل مجموعة من خدمة المناطق النائية. توفر ضخمة والتخزين الموزعة وقوة المعالجة، والتي يمكن الوصول إليها من قبل أي جهاز متصل بالإنترنت تشغيل مستعرض الويب.
Client	Client	Client
computer that retrieves information from or uses resources provided by the server or main computer.	ordinateur qui extrait des informations en provenance ou utilise des ressources fournies par le serveur ou d'un ordinateur principal.	جهاز كمبيوتر يقوم باسترداد المعلومات من أو يستخدم الموارد المقدمة من قبل الملقم أو الكمبيوتر الرئيسي.
Cluster	Cluster	Cluster
define a group of computers or servers that share the work as one. Making one big computer instead of multiple smaller computers.	définir un groupe d'ordinateurs ou de serveurs qui partagent le travail comme l'un. Faire un gros ordinateur au lieu de plusieurs petits ordinateurs.	لتحديد مجموعة من أجهزة الكمبيوتر أو ملقمات التي تشترك في عمل واحد. جعل جهاز كمبيوتر واحد كبير بدلا من أجهزة الكمبيوتر أصغر متعددة

English	Français	عربي
<p>Active attack: attack resulting in an illegal modification of a condition, such as manipulating files on a .server</p>	<p>Attaque active : Attaque se traduisant par une modification illégale d'un état, par exemple la manipulation des fichiers sur un serveur.</p>	<p>نشاط هجومي: وهو فعل يؤدي إلى تعديل غير المشروع للحالة، مثل التلاعب في الملفات الموجودة على الخادم.</p>
<p>AIS (Automated Information System): Automated Information System. Term for all equipment (hardware, software kind, or "firmware") for the automatic acquisition, storage, handling, controlling, viewing, transmitting, or receiving .data</p>	<p>AIS (Automated Information System): Système d'information automatisé . Terme désignant tous les équipements (de nature matérielle, logicielle, ou "firmware") permettant l'acquisition automatique, le stockage, la manipulation, le contrôle, l'affichage, la transmission, ou la réception de données.</p>	<p>AIS (نظام المعلومات الآلي): هو المدى لجميع المعدات (الأجهزة ونوع البرامج، أو "البرنامج") للشراء التلقائي والتخزين والمناولة، والسيطرة، وعرض أو استقبال البيانات.</p>
<p>Alert: Message describing a circumstance relevant to network security. The alerts often come from active surveillance systems on .the network</p>	<p>Alert : Message décrivant une circonstance se rapportant à la sécurité réseau. Les alertes viennent souvent de systèmes de surveillance actifs sur le réseau.</p>	<p>تنبيه: رسالة تصف الظروف ذات الصلة لأمن الشبكات. التنبيهات وغالبا ما تأتي من أنظمة المراقبة النشطة على الشبكة</p>
<p>Ankle-Biter: A person wanting to become Hacker or Cracker but having very little knowledge of computer systems. They are mostly young teenagers using easy-to-use programs and .from the internet</p>	<p>Ankle-Biter : Personne voulant devenir Hacker ou Cracker mais ayant très peu de connaissances sur les systèmes informatiques. Ce sont la plupart du temps des jeunes adolescents se servant de programmes faciles à utiliser et provenant d'internet .</p>	<p>الكاحل العاض: شخص يريد أن يصبح هاكر أو التفسير ولكن لديهم معرفة قليلة جدا من أنظمة الكمبيوتر. وهم في الغالب من المراهقين الشباب باستخدام برامج سهلة الاستخدام ومن الإنترنت.</p>
<p>Audit: Examination of information and activities to ensure that they meet the established controls and operational procedures</p>	<p>Audit: Examination des renseignements et activités dans le but de s'assurer qu'ils respectent les contrôles établis et les procédures opérationnelle.</p>	<p>مراجعة: فحص المعلومات والأنشطة للتأكد من أنها تلتبي الضوابط والإجراءات المتبعة التشغيلية.</p>

<p>Audit Trail: Recording the use of system resources on a computer identification, accessed ... files, rights violations</p>	<p>Audit Trai: Enregistrement de l'utilisation des ressources systèmes sur un ordinateur : identification, fichiers accédés, violations des droits...</p>	<p>تدقيق تريل: تسجيل استخدام موارد النظام على تحديد الكمبيوتر، والملفات الوصول إليها، وانتهاكات حقوق ...</p>
<p>Authentication Header (AH): Identification Header. Champs following the IP header in an IP datagram and verifies the origin and integrity of the datagram.</p>	<p>Authentication Header (AH) : En-tête d'identification . Champs qui suit l'en-tête IP dans un datagramme IP et qui vérifie la provenance et l'intégrité du datagramme.</p>	<p>رأس المصادقة (AH): تحديد رأس الملكية الفكرية في مخطط بيانات IP والتحقق من المنشأ وسلامة مخطط البيانات.</p>
<p>Automated Security Monitoring: automatic security management. Term for all security services ensuring a level of effective protection for the hardware environment, software environment, and any kind of data.</p>	<p>Automated Security Monitoring : Gestion automatique de la sécurité. Terme désignant tous les services de sécurité assurant un niveau de protection effectif pour l'environnement matériel, l'environnement logiciel, et toute sorte de données</p>	<p>رصد الأمن الآلي: إدارة الأمن التلقائي. المدى لكافة الأجهزة الأمنية وضمان مستوى من الحماية الفعالة لبيئة الأجهزة والبرمجيات ، وأي نوع من البيانات</p>
<p>Breach: A term used when a successful attack on a server, during penetration of a system.</p>	<p>Brèche : Terme employé lors de la réussite d'une attaque sur un serveur, lors de la pénétration d'un système .</p>	<p>خرق: مصطلح يستخدم عندما الهجوم الناجح على الخادم، أثناء الإبلاغ للنظام.</p>
<p>Biba Integrity Model: Formal Security Model for the integrity of the subjects and objects of a .system</p>	<p>Biba Integrity Model : Modèle formel de sécurité pour l'intégrité des sujets et objets d'un système.</p>	<p>بيبا نموذج النزاهة: نموذج الأمن الرسمي لسلامة المواد والأشياء من هذا النظام.</p>
<p>Buffer overflow: A phenomenon occurring when the buffer (buffer) can not properly handle all the data it receives. This happens when the addressee of the data transfer rate is too lower than the sender. A buffer overflow often causes a crash of the target system; so it can be used .voluntarily by a hacker</p>	<p>Buffer Overflow : Phénomène se produisant lorsque le tampon (buffer) ne peut pas traiter correctement toutes les données qu'il reçoit. Cela arrive quand le taux de transfert de données du destinataire est trop inférieur à celui de l'expéditeur. Un buffer Overflow entraîne très souvent un crash du système cible; c'est pourquoi il peut être</p>	<p>تجاوز سعة المخزن المؤقت: هناك ظاهرة تحدث عندما المخزن المؤقت (عازلة) لا يمكنه التعامل مع جميع البيانات التي تتلقاها بشكل صحيح. يحدث هذا عندما يكون المرسل من معدل نقل البيانات أقل أيضا من المرسل. وتجاوز سعة المخزن المؤقت في كثير من الأحيان يؤدي إلى انهيار النظام المستهدف. لذلك يمكن استخدامها طواعية من قبل القرصنة.</p>

	utilisé volontairement par un hacker.	
<p>Anomaly Detection Model :</p> <p>Anomaly detection is the identification of data points, items, observations or events that do not conform to the expected pattern of a given group. These anomalies occur very infrequently but may signify a large and significant threat such as cyber intrusions or fraud.</p>	<p>Anomaly Détection Model:</p> <p>Système de sécurité détectant les intrusions en recherchant les activités sortant du comportement habituel du système et des utilisateurs.</p>	<p>شذوذ نموذج الكشف:</p> <p>نظام الأمن بالكشف عن الاختراقات من خلال النظر للأنشطة خارج السلوك العادي للنظام والمستخدمين.</p>
<p>Application Level Gateway (Firewall) :</p> <p>The primary method for keeping a computer secure from intruders. A firewall allows or blocks traffic into and out of a private network or the user's computer. Firewalls are widely used to give users secure access to the Internet as well as to separate a company's public Web server from its internal network. Firewalls are also used to keep internal network segments secure; for example, the accounting network might be vulnerable to snooping from within the enterprise.</p>	<p>Passerelle d'application niveau (firewall):</p> <p>Un firewall est un système ou une application qui gère l'ensemble des connections TCP lors d'une session réseau. Ces "murs de feu" redirigent souvent les paquets sortants afin d'en camoufler l'expéditeur.</p>	<p>تطبيق بوابة المستوى (جدار) :</p> <p>جدار الحماية هو نظام أو التطبيق الذي يدير كافة الاتصالات في جلسة عمل شبكة اتصال. هذه "الجدران النار" في كثير من الأحيان إعادة توجيه الحزم الصادرة من أجل إخفاء المرسل</p>
<p>ASIM (Automated Security Incident Measurement) :</p> <p>Automatic evaluation of a security incident. Monitors network traffic and collects information</p>	<p>ASIM (Automated Security Incident Measurement):</p> <p>Evaluation automatique d'un incident de sécurité. Surveille le trafic réseau et collecte des</p>	<p>: ASIM</p> <p>التقييم التلقائي من وقوع حادث أمني. تراقب حركة مرور الشبكة وجمع المعلومات عن عناصر الشبكة التي تم الكشف عن نشاط غير مصرح به</p>

on network elements that unauthorized activity is detected.	informations sur les éléments du réseau où des activités non autorisées sont détectées.	
<p>Assesment : is the process of reviewing and analyzing a computer network for possible security vulnerabilities and loopholes.</p> <p>It is used by network administrators to evaluate the security architecture and defense of a network against possible vulnerabilities and threats.</p>	<p>Assesment : Analyse des vulnérabilités d'un système d'information automatisé consistant en la surveillance et l'inspection du système dans le but d'aider l'administrateur à le sécuriser de la meilleure façon possible.</p>	<p>التقييم: هو عملية مراجعة وتحليل شبكة الكمبيوتر عن الثغرات الأمنية المحتملة والثغرات. يتم استخدامه من قبل مديري الشبكة لتقييم البنية الأمنية والدفاع شبكة ضد مواطن الضعف والتهديدات المحتملة.</p>
<p>Attack : deliberate exploitation of computer systems, technology-dependent enterprises and networks. Cyberattacks use malicious code to alter computer code, logic or data, resulting in disruptive consequences that can compromise data and lead to cybercrimes, such as information and identity theft.</p>	<p>Attaque: Tentative d'évitement des contrôles de sécurité sur un serveur. Le succès de l'attaque dépend de la vulnérabilité du serveur attaqué, mais si elle réussit, l'attaquant aura un accès illimité au serveur et pourra faire tout ce qu'il veut (vol, destruction de données...)</p>	<p>الهجوم: الاستغلال المتعمد لأنظمة الكمبيوتر، والشركات التي تعتمد على التكنولوجيا والشبكات. الهجمات السببية استخدام شيفرات خبيثة لتغيير رمز جهاز الكمبيوتر، منطق أو بيانات، مما أدى إلى عواقب مدمرة التي يمكن أن تعرض البيانات وتؤدي إلى الجرائم الإلكترونية، مثل المعلومات وسرقة الهوية.</p>
<p>Back Door : A backdoor is a technique in which a system security mechanism is bypassed undetectably to access a computer or its data. The backdoor access method is sometimes written by the programmer who develops a program. A backdoor is also known as a trapdoor.</p>	<p>Porte de derrière : Trou de sécurité laissé volontairement dans le système, souvent sous la forme d'un programme dissimulé, par l'administrateur ou par un hacker ayant obtenu un accès root afin de pouvoir conserver cet accès sans forcer la sécurité du système. Voir le film "Wargames".</p>	<p>الباب الخلفي: ومستتر هو يتم تجاوز نظام تقني في آلية أمنية خامسة اكتشافها الوصول إلى جهاز الكمبيوتر أو البيانات وتكنولوجيا المعلومات والاتصالات. هو مكتوب أسلوب الوصول مستتر من قبل البرنامج في بعض الأحيان الذي يطور برنامجا. ومستتر هو الباب المسحور معروف أيضا باسم.</p>
<p>Bomb : logic bomb ; a program routine that destroys data when certain conditions</p>	<p>Bombe : Terme désignant tout type de d'attaque visant à crasher le système cible</p>	<p>قنبلة: قنبلة المنطق. روتين البرنامج الذي يدمر البيانات عند استيفاء شروط معينة. على سبيل المثال،</p>

<p>are met; for example, it may reformat the hard disk or insert random bits into data files on a certain date or if a particular employee record is missing from the employee database. Many viruses are logic bombs because they deliver their payload after a specific latency or when a trigger event occurs.</p>	<p>en utilisant des failles logicielles ou protocolaires.</p>	<p>قد تهيئة القرص الثابت أو إدراج بت عشوائي إلى ملفات البيانات في تاريخ معين أو إذا كان سجل موظف معين مفقود من قاعدة بيانات للمستخدمين. العديد من الفيروسات ومنطق القنابل لأنها تقدم حمولتها بعد كمون معين أو عند حدوث حدث الزناد.</p>
<p>Broadcast : Broadcasting is the simultaneous transmission of the same message to multiple recipients. In networking, broadcasting occurs when a transmitted data packet is received by all network devices.</p>	<p>Diffusion: Ping envoyé par l'ordinateur local vers tous les autres ordinateurs du réseau. L'ordinateur local reçoit donc les réponses de tout le monde. C'est utile lorsque qu'un ordinateur récemment connecté à un réseau veut connaître les adresses IP de tout les autres ordinateurs.</p>	<p>البيث : البيث هو الإرسال المتزامن من نفس الرسالة إلى عدة مستلمين. في الشبكات، يحدث البيث عند تلقي حزمة البيانات المرسله من قبل جميع أجهزة الشبكة.</p>

<p>Bug : a bug refers to an error, fault or flaw in any computer program or a hardware system. A bug produces unexpected results or causes a system to behave unexpectedly. In short it is any behavior or result that a program or system gets but it was not designed to do.</p>	<p>Punaise : Malfonction d'un programme ou d'un matériel due à une erreur involontaire de programmation ou de construction.</p>	<p>علة: خطأ أو خلل في أي برنامج كمبيوتر أو نظام الأجهزة. الشوائب ينتج نتائج غير متوقعة أو يتسبب نظام لتتصرف بشكل غير متوقع. باختصار هو أي سلوك أو يؤدي إلى أن برنامج أو نظام يحصل ولكن لم تكن مصممة للقيام به.</p>
<p>Computer Abuse : Act prohibits the use of federal and certain computers of financial institutions beyond the bounds of the authorization given to the</p>	<p>Abus informatique: Activité illégale volontaire qui affecte la disponibilité, la confidentialité, ou l'intégrité des ressources d'un ordinateur. Les "Computer Abuse"</p>	<p>إساءة استخدام الكمبيوتر: يحظر القانون استخدام أجهزة الكمبيوتر الاتحادية وبعض المؤسسات المالية خارج حدود التفويض الممنوح للشخص. هذه هي أساسا للقضاء أو على الأقل الحد من حالات الغش وسوء</p>