ESP Needs Analysis of Greater-Casablanca Engineering Students

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Abstract

The current paper aims to investigate the English language needs of the Greater-Casablanca engineering students. The work represents a longitudinal study that was conducted over two academic years, from September 2019 till July 2021, in four higher specialized institutions; all are from the Greater Casablanca region, namely the Higher National School of Arts and Crafts (ENSAM), the Hassania School of Public Works (EHTP), the Higher National School of Electricity and Mechanics (ENSEM), and the Faculty of Science and Technology (FST). For this purpose, a total of 300 engineering students as well as 60 managers who are basically former students of the four abovementioned schools, 10 specific content instructors, and 10 EFL teachers. Five streams representing key Moroccan industries specifically the Mechanical, the Electrical, and the Industrial streams from ENSAM and ENSEM, the Civil engineering stream from EHTP, and the computing stream from FST, took part in the study which was designed on a qualitative and quantitative basis using a placement test, questionnaires and interviews. From each stream, sixty students, two EFL teachers, and two specific content instructors were selected. The outcome of the study will call attention to the significant role that ESP can play to boost engineering students' career. It will also define engineering students' most needed English language skills as well as portraying their learning preference s with regard to the ESP course. Finally, a number of implications and recommendations will be drawn.

Keywords: Needs Analysis, Engineering Students, ESP, Higer Education

Introduction

Engineering schools are considered to be key institutions for the training of leaders of tomorrow in Morocco. Therefore, it is strongly believed that ESP can play an important role in keeping in grips with advances of research and innovations in this area especially that our country is seeking other opportunities via the conquest of new markets in which English is used as a lingua franca like the Middle East, Asia, and Africa. However, being considered as a situational program, ESP cannot take place without an inclusive Analysis of needs (Hutchinson & Waters, 1987) involving all the stakeholders i.e. the teacher; the learner; the institution; the employer. The analysis should start with a task analysis process i.e. the identification, and the description of the target behavior to come up with a sequencing of the target language. The post needs analysis deliverable will include the following elements:

- A comprehensive description of the target situation.

- The language and the skills required to be a peak performer in the target situation.

- Determining the right entry point for ESP instruction (Current skills – Required skills in the target situation=Entry point).

- Assessment of the gap between the learner's current situation and target situation.

- To this end, the current work is seeking to investigate the English language needs of the engineering students in four engineering institutions located in the Greater-Casablanca region.

Research Questions
Our current work will try to deal with four research questions:

- What is the actual level of the engineering students' English proficiency before taking an ESP course?

- To what extent the participants perceive English as an important constituent of the engineering curriculum?

- What are the most important language components to be included in the ESP course?

- What are the most favored learning modalities of engineering students in an ESP class?

Literature Review
The concept of ESP has endured constant modifications and improvements since its emergence sixty years ago. Hence, a review of the main ESP definitions would be vital for our current work so as to achieve a complete understanding of the concept's implications and provisions. To begin with, Robinson sees ESP as a purposeful course which 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. Any ESP course may differ from another in its selection of skills, topics, situations and functions and also language. It is likely to be of a limited duration.''* (1980, p. 13). Eleven years later, Robinson (1991) refined her definition by incorporating two parameters. (1) ESP classes are homogenate, and (2) they are limited to adult learners in academic or work settings. Another interesting contribution to ESP definition would be Dudley-Evans and St. John's (1998) notion of 'absolute and variable' characteristics. Three absolute characteristics were suggested:
(1) ESP is meant to meet specific needs of the learner (a learner- centered approach); (2) it takes up the subject-matter's underlying methodology and components; (3) it deals with the specific language of the discipline (grammar, lexis, register). Conversely, the researchers proposed four variable features: (1) ESP may be designed for specific disciplines; (2) it may adopt a different teaching methodology from that of general English; (3) it is mostly intended for adult learners, either in a higher institution or at work. Yet, it may be designed for secondary school learners;
(4) it is commonly assuming ''some basic knowledge of the language system, but it can be used with beginners.''
(1998, p: 4). However, the most consistent definition that is serving the purpose of our current study remains Hutchinson and Waters (1987) view of ESP as ''*an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning*'' (1987, p: 19).
Indeed, what follows from Hutchinson and Waters*'* perception is one of the most central concepts in ESP pedagogy which is indisputably ' *Needs Analysis'*. It is worth noting, at the commencement, to call attention to the major developments, made in the fields of linguistics and educational psychology, which have contributed in the emergence of needs analysis in ESP. Indeed, the new discourse-rhetorical analyses and communicative approaches in linguistics have brought the idea that spoken and written language greatly differs from one context to another. Also, learners' needs are now taken into consideration by adjusting the language of teaching to go well with these needs (Hutchinson and Waters, 1987). Equally important, in educational psychology, teachers and course designers benefited from the link that has been established between learning effectiveness and learners' needs and attitudes. The 1960s witnessed the introduction of '*Needs analysis*' (henceforth NA) into language teaching through ESP movement. NA is commonly defined as the process of collecting data, through specific means (e.g. placement tests, questionnaires…), in order to extract the relevant information allowing the identification of students' needs in a particular context and hence having a clear vision so as to develop a custom-made course. In a more specific definition of NA, Flook (1993) states that both the students' needs and what they have to do in the target situation are to be taken into consideration in every ESP pedagogical context. Richards and Platt (1992) also consider NA as "the process of determining the needs for which a learner or a group of learners acquires a language and arranges the needs according to priorities." (p: 242). What follows from the abovementioned definitions is that there are different types of needs an ESP practitioner should be capable of analyzing for the sake of designing a fitting course. Indeed, the ESP practitioner is meant to be informed not only about learners'

needs but also about how they can learn. According to Hutchinson and Waters (1987) two types of needs are identified: '*Target and Learning needs*'. Target needs deal with what the learners learn in the target situation and how this learning can meet their wants, make up their lacks, and satisfy their necessities. For Hutchinson and Waters target needs are ''what the learner needs to do in the target situation" (1987, p: 54).

These needs are, indeed, an attempt to provide an answer about the language features needed to accomplish a specific communication objective. Therefore, the role of ESP practitioners, who are conducting a NA process, is to collect data regarding their learners' necessities, lacks and wants. Robinson (1991) describes necessities as objectives to be achieved. They are, indeed, the study or work requirements of the target situation, to be precise, necessities represent what the learner must learn so as to successfully perform in academic/professional target situation. Lacks represent that void between the learner's real proficiency level and the language proficiency he/she has to achieve by the end of the language course. It can be also said that lacks are the difference between what a student already know and what he/she is lacking. It is, in fact, this difference in potential between the expected high proficiency level and the initial low proficiency level which triggers students to fill in their gaps.

Hutchinson and Waters (1987) define wants as being the learners' expected gains vis-à-vis the language course. In this case, Wants represent what learners hope and long to achieve from English learning. Indeed, this subdivision of target needs tends to be subjective as it reflects purely personal expectations. It is notable to stress, at this point, the authenticity of these wants which usually tend to run counter to the target situation's realities and perceived objectives. In this regard, ESP practitioners need to be very reflective regarding how to fit in with the needs of both poles e.g. the learner and the employer bearing in mind that these personal judgments, if to be partially satisfied, can be processed only from the majority's vantage point and not on an individual basis. The second type of needs in Hutchinson and Waters' NA model (Fig. 1) is the '*Learning needs*'. In fact, while target needs might be linked to both of the learners' perception about what they need to learn in the language course and the situation in which they will use language, learning needs, however, represent the *"Factors that affect the learning like attitude, motivation, awareness, personality, learning styles and strategies, together with the social background"* (Xiao, 2007, p:2). Indeed, learning needs deal with the path learners take from their deficiencies in the target situation to their academic or professional objectives.

This journey usually requires a reflection. So, if the destination needs a car to be reached, '*learning needs',* then, involve the question of how learners would get the car, buy it, rent it, take it, or steal it? e.g. learning needs start with an identification of learners' lacks and then shed light on the means through which learners progress in order to accomplish their target needs.

Clearly, NA is a process for the collection of data regarding learners' needs for the sake of designing fitting courses. This situational analysis relies on different sources and methods to collect data. Indeed, NA seeks to achieve different purposes namely the identification of the content of a particular course and how it should be conducted.

Methodology

The current study will adopt a mixed method approach in a sequential explanatory design. (Creswell, 2012) Firstly, a placement test will be used to identify the English

language proficiency level of engineering students.

Secondly, questionnaires will be administered as a source of primary data collection. Structured questionnaires (both open- ended and closed-ended questions) will be used to collect facts and figures from EFL teachers, specialty subject instructors, engineering students, and in-service engineers.

Interview will be another source of primary data collection with the intention of investigating issues in deeper manner and have a complete picture about the needs. (Daniel and Sam, 2011) This is proven in Descombe's book The Good Research Guide:

"The Mixed Methods approach is valuable, too, as a means for developing research instruments. For example, researchers who are designing a questionnaire for use in a survey can employ qualitative data through focus groups and interviews to improve the validity of a subsequent survey questionnaire that produces quantitative data. The qualitative data collected through interviews and focus groups can be valuable initially as a way of shaping the kind of questions that are relevant and then subsequently to ensure

that the questions have been worded suitably''. (Descombe, 2007, p: 110)

The quantitative and qualitative sampling will be selected from the same population: teachers, students, and employers (parallel), and data will be collected from these three samples in stages (sequentially). As for the interpretation of these two types of data, it will be in graphs, charts and in narrative. Also, a free statistical analysis program will be used to analyze the quantitative collected data.

The participants represent three Engineering schools and one Science and Technology faculty; all located in the Greater- Casablanca region.

Firstly, the Higher National School of Arts and Crafts (ENSAM), and the Higher National School of Electricity and Mechanics (ENSEM) which prepare future engineers in the fields of electrical, mechanical, and industrial engineering.

Secondly, the Hassania School of Public Works (EHTP) which trains future engineers in the field of civil engineering. Finally, the Faculty of Science and Technology (FST) where the focus will be only on computing engineering students. Candidates are admitted to the engineering cycle within these higher specialized institutions upon the completion of an integrated two-year preparatory cycle which is the case of ENSAM and FST, or after passing the common national contest for admission to engineering training institutions and similar institutions, which is the case of EHTP, ENSEM, and FST. It is notable to mention that holders of the DEUG, DEUST, and License diplomas can be also admitted to the first year and second year engineering cycle.

The training during the engineering cycle consists of six semesters spread over three years. The teaching of English is limited to the first four semesters. The time allotted for the teaching of English per semester is two hours a week spreading over 12 weeks.

From each engineering cycle, two EL teachers, two specialty content instructors, and sixty first year students will be selected randomly and whose needs will be tracked to the second year via questionnaires.

Based on Hutchinson and Waters' target situation analysis framework (1987), it was seen of paramount importance to identify the point of view of potential employers who are deemed a key stakeholder in our target needs analysis procedure and who will enable us to explore different beliefs about ESP needs. To this end, close-ended questionnaires will be used to collect data from sixty in-service engineers who are mainly former students of the schools under study and who belong to eight relevant Moroccan industries namely OCP, SONASID, JESA, SOMACA, SOPRIAM, DELATTRE, NOVEC, and Soft Group.

It is worth noting that ethical matters are taken into consideration when devising questionnaires and sitting for interviews.

Participants have the choice to participate or the right to withdraw at any stage of the survey.

A written consent request will be sent to schools to show their interest in participating in the survey.

All the participants are told about the confidentiality and anonymity of data.

Findings and Discussion

In the four above-mentioned specialized institutions participating in this study as in all the engineering schools in Morocco, English is considered as a compulsory subject. This is due to the fact that the faculty of these schools deems the mastery of English an essential constituent of their graduates' training. In line with this situation, the current study attempts to answer four research questions. Firstly, the study investigates the actual level of the engineering students' English proficiency. Secondly, it measures the importance of English in engineering as probably one of the most internationalized fields of study. Thirdly, it explores the specific English language needs of engineering students. Fourthly, it looks into the most favored learning modalities of engineering students in an ESP class.

➢ **Research question 1**: What is the actual English language proficiency level of engineering students before taking ESP classes?

In order to assess the engineering students' current language abilities a web-based Placement Test (WBPT) was taken by 300 students at the beginning of the first semester of the engineering cycle. It is notable to mention that the Placement Test consisted of an oral component too. the purpose of the proficiency testing was to measure what engineering students were able to do with the language before the onset of ESP classes.

Figure 1: Engineering students' English proficiency level according to the WBPT

According to figure 1, the proficiency level of the engineering students participating in the research fluctuates between A1-A2 and B1-B2 levels. However, only few students have a C1-C2 level. The results of the WBPT reveal that EFL teachers who are in charge of conducting ESP courses in these schools will be facing the problem of mixed ability classes. It is worth noting that the oral component of the test which was conducted just after the WBPT via ZOOM platform also revealed the same discrepancy in the engineering students' English proficiency level.

➤ **Research question 2:** To what extent the participants perceive English as an important constituent of the engineering curriculum?

To collect data for this RQ, both structured questionnaires and semi-structured interviews were used. Both engineering students and EFL teachers were asked a set of pre-coded questions on a continuum from Very Important to Unimportant. The employers, on the other hand, were interviewed via closed-ended questions though some questions were arising spontaneously in a free- flowing conversation.

a. Do you think English is important in your program of study?
b. What impact would English have on your professional career?
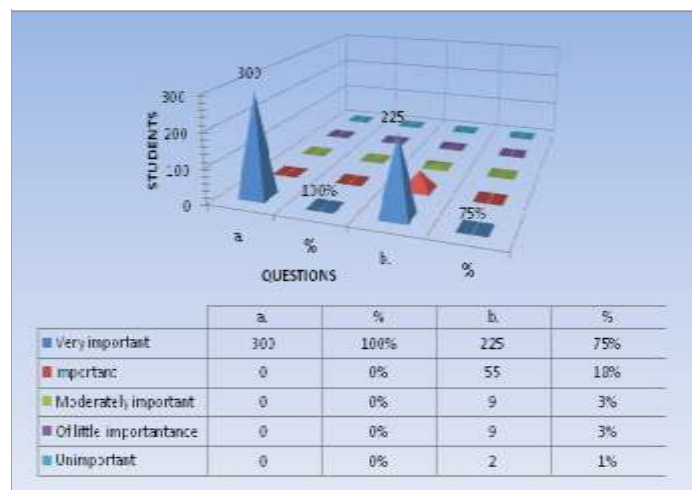

Figure 2: Engineering Ss' perception of the current and the potential importance of English

According to figure 2, the majority of engineering students acknowledge the paramount importance of English for their current studies and future career. Indeed, 100% of the respondents believe English to be a very important component of their engineering curriculum, and 75% expects it to have a very important impact on their future career.

Similarly, the rest of the participants did not depart from this consensus, as the predominant opinion was to emphasize the importance of English for the engineering students' academic pathway, as well as for their future professional tasks.
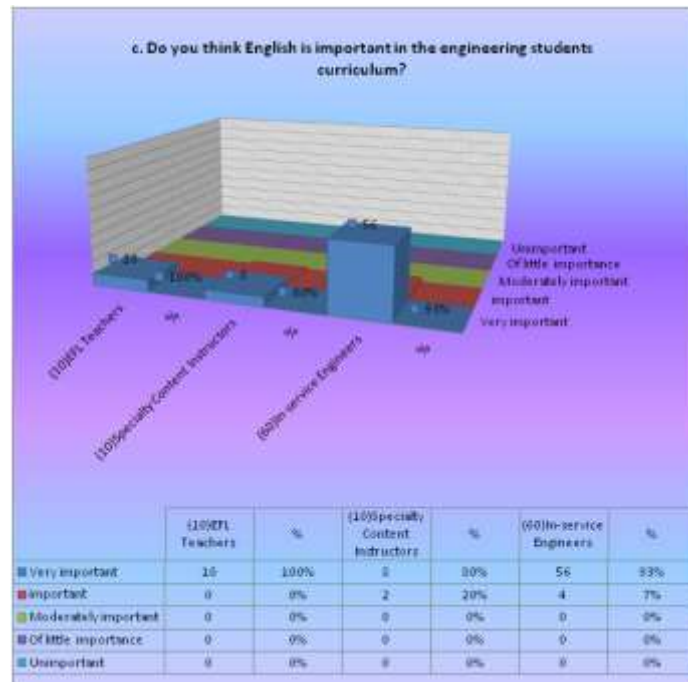

c. Do you think English is important in the engineering students curriculum?

	(10)EFL Teachers	%	(10)Specialty Content Instructors	%	(60)In-service Engineers	%
Very important	10	100%	8	80%	56	93%
Important	0	0%	2	20%	4	7%
Moderately important	0	0%	0	0%	0	0%
Of little importance	0	0%	0	0%	0	0%
Unimportant	0	0%	0	0%	0	0%

Figure 3: EFL teachers, SC instructors, and In-service engineers' opinion about the importance of English in the engineering students' training

Figure 3 shows that the majority of EFL teachers, specialty content instructors, and in-service engineers, who responded to question (a), think English is a very important element in the engineering students' training.
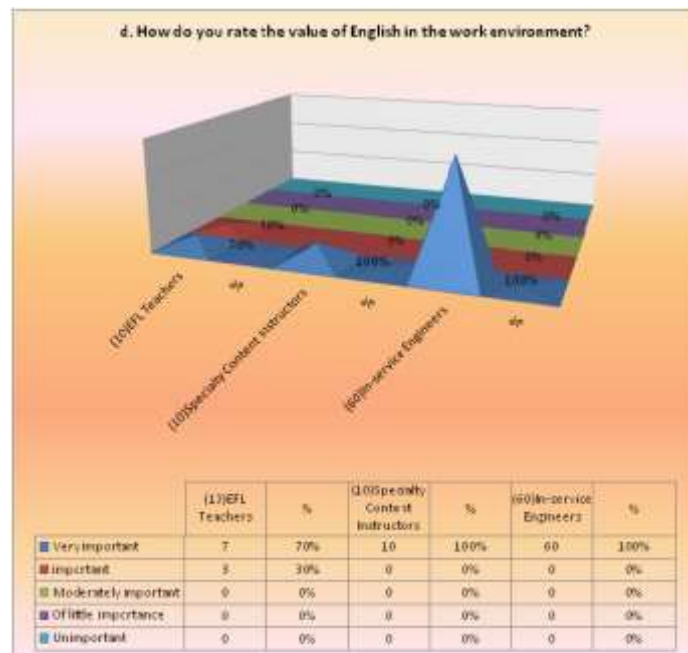

d. How do you rate the value of English in the work environment?

	(1)EFL Teachers	%	(10)Specialty Content Instructors	%	(60)In-service Engineers	%
Very important	7	70%	10	100%	60	100%
Important	3	30%	0	0%	0	0%
Moderately important	0	0%	0	0%	0	0%
Of little importance	0	0%	0	0%	0	0%
Unimportant	0	0%	0	0%	0	0%

Figure 4: EFL teachers, SC instructors, and In-service engineers' perception of the importance of English in the engineering students' future job

The statistics in Figure 4 above stress the very positive perception of all the stakeholders in this study regarding the fundamental contribution of English in the success of engineering graduates in their future

jobs. The table above indicates that the greater part of the participants in this study share the opinion that English is an essential tool engineering student must have to be distinct in the job market, while none of the participants mentions that English is not important for the engineering students' future job.

In order to deeply scrutinize the significance that English may have in the engineering job market, other questions were to be asked on in-service engineers specifically.

- Was English a key determinant to get your current job?
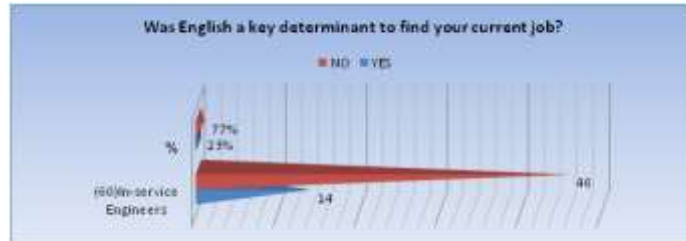- Do you use English in your current job?

Figure 5: English as a key contributor for in-service engineers to get a job

The above graph reveals a divergence between the participants' perception of the importance of English in the engineering students' would-be employment and the reality of professional practice of in-service engineers. Indeed, in figure 4, the majority of the participants approve the great importance English may represent in the engineering students' future jobs. However, only 23% of in-service engineers, according to figure 5, confirm that English was a key element for them to get a job.

In a free discussion, on the sidelines of the semi-structured interviews, with the in-service engineers, this discrepancy of opinion is explained by the fact that 77% of these in-service engineers work for national companies where French still primes. These latter asserted that English was not necessary to pass a job interview in Morocco, though all the interviewees stated that they were required to answer some questions in English during their job interviews. According to them, the importance of English is mostly felt in the context of the professional development of in- service engineers as well as in their need to access higher levels of responsibility especially that the relevant Moroccan companies are opening or already possesses subsidiaries in African and Asian English speaking countries. On the other hand, the 23% of in- service engineers who affirmed that English was a contributing factor at their recruitment process justify this with the fact that they work for multinational companies where English is the working language. They also explain that English is crucial for them to present their concepts and designs to customers, colleagues, and decision-makers in presentations, meetings, and reports.
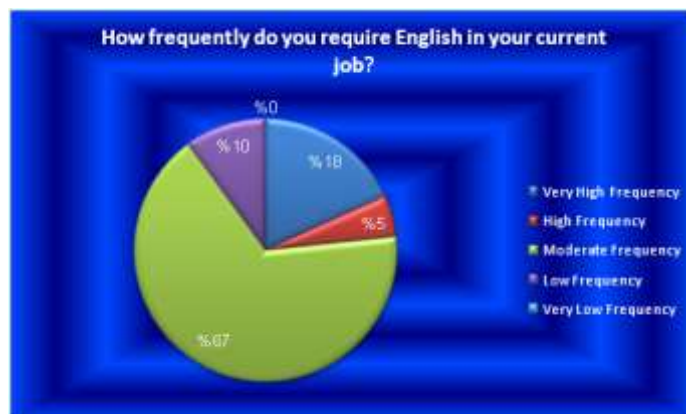

Figure 6: English occurrence in in-service engineers' current job

Before analyzing the data on figure 6, it is worth noting that the choice of the verb 'require' over the verb 'use' to formulate the question was deliberate as the verb 'use' may give the impression for the interviewees to refer just to speaking and writing the language whereas English may be required to perform daily tasks far from the two latter purposes, e.g., doing a research on internet, reading a technical document, or even listening to an audio message. The above graph illustrates that the majority of in-service engineers has need of English in their professional setting. The interviewees rated the frequency of their need for English as follows: Very High 18%, High 5%, Moderate 67%, and Low 10%. These statistics, if linked to the data on the different graphs above especially figure 2, where the overwhelming majority of engineering students expressed their high interest in learning English, reinforce the hypothesis stipulating that English is crucial for engineering students to be successful in both their engineering course and their future job. This also signifies that the need and the motivation to learn English are very high. Hence, in order to increase the chances of successful English learning in the higher specialized institutions participating in this study, this motivation for learning English has to be matched with the content of the course (Kennedy and Bolitho, 1984). Thus, other questions are to be asked in order to make the needs for learning English specific.

- ➢ **Research question 3:** What are the most important language components to be included in the ESP course?

Table 1

Perception of Engineering Students' Target Needs from the Perspective of Multiple Stakeholders

LGE SKILLS/COMP	ENG. Ss		EFL. Ts		SC. Ins		In-s. Engs	
	F	%	F	%	F	%	F	%
READING	146	49%	05	50%	09	90%	14	23%
LISTENING	287	96%	07	70%	06	60%	60	100%
WRITING	197	66%	04	40%	05	50%	40	67%
SPEAKING	294	98%	10	100%	08	80%	60	100%
GRAMMAR	89	30%	08	80%	06	60%	24	40%
PRONUNCIATION	211	70%	04	40%	04	40%	23	38%
GENERAL VOCAB	165	55%	03	30%	03	30%	55	92%
TECHNICAL VOCAB	270	90%	09	90%	10	100%	44	73%
Total	300		10		10		60	

ENG. Ss=ENGINEERING STUDENTS/ EFL. Ts=EFL TEACHERS/ SC. Ins=SPECIALTY CONTENT INSTRUCTORS/ In-s. Engs=IN-SERVICE ENGINEERS

Table 2

The most important in-service engineers' communicative events occurring in the workplace

COMMUNICATIVE EVENTS IN ENGLISH	VHF 5	HF 4	MF 3	LF 2	VLF 1	MEAN
1. Communicating via emails	40	13	6	1	0	4.53
2. Writing memos, formal letters, minutes of meetings, reports, presentation slides, and proposals	5	2	39	9	5	2.61
3. Writing technical reports	1	3	5	42	8	2.06
4. Directing, explaining, demonstrating, and motivating	1	1	6	45	7	2.06
5. Negotiating with team members	0	0	1	5	54	1.11
6. Resolving conflicts	13	17	10	12	8	3.25
7. Telephoning	1	2	1	40	16	1.86
8. Communicating with customers/ colleagues/ supervisors/subordinates/subcontractors/ suppliers	30	14	10	5	1	4.11
9. Discussing professional issues informally	29	19	11	1	0	4.26
10. Discussing professional issues formally	33	9	11	5	2	4.10
11. Reporting work progress/ technical problems	6	4	12	33	5	2.55
12. Negotiating technical specifications with customers and suppliers	04	24	26	3	2	3.36
13. Socializing (e.g. during breaks and lunch time)	8	6	36	6	4	3.13
14. Networking and building relationships	25	14	9	9	3	3.96
15. Giving oral presentations	9	8	19	17	7	3.06
16. Presenting new concepts, solutions, and strategies	12	23	14	7	4	3.53
17. Reading professional texts e.g. online user manuals and contracts	3	5	6	30	16	2.15
18. Reading products specifications/ descriptions	2	3	7	34	14	2.08
19. Listening to presentations and discussions in meetings, seminars or conferences	46	8	5	1	0	4.63
20. Listening to English-speaking managers' instructions	34	12	8	4	2	4.2
21. Doing research on the internet	20	16	22	2	0	3.9

VHF=very high frequency/HF=high frequency/MF=moderate frequency/LF=low frequency/VLF=very low frequency

Table 3

The most preferred learning and teaching modalities of both ENG.Ss and EFL.Ts

PREFERRED LEARNING / TEACHING MODALITIES				
ENGINEERING STUDENTS		EFL TEACHERS		STATISTICS
LEARNING MODALITIES	%	TEACHING MODALITIES	%	STDV
Substitution exercises	40%	Controlled practice activities	80%	28.28
Question/Answer practice	33%		77%	31.11
Gap-fills	32%		90%	41.01
Learning via dictation	16%	Dictating	10%	4.24
Role-plays	88%	Teaching through role-playing	90%	1.41
Solving problems	65%	Problem-based Learning	70%	3.53
Practicing speaking through discussions, simulations, and shadowing	86%	Free practice speaking activities	90%	2.82
Listening to the teacher/taking notes	77%	Lecturing	30%	28.28
Reading outside the class for pleasure	70%	Encouraging extensive reading	80%	7.07
Delivering ppt presentations related to engineering	66%	Project-based Learning	40%	18.38
Working on a case-study	67%		40%	19.09
Working on a project	70%		30%	28.28
Reading aloud from the textbook	13%	Teaching via traditional instructional materials	60%	33.23

Reading from the handouts	22%		70%	33.94
Copying from/writing on the board	29%		60%	21.92
Taking notes from the teachers' slides	34%		90%	39.59
Taking notes on/ using laptop	41%	Technology-based learning	90%	34.64
Watching videos	78%		70%	5.65
Listening to audio materials	71%		100%	20.50
Group work\Pair work	80%	Collaborative learning	90%	7.07
Learning language components through games	89%	Game-based learning	80%	6.36
Doing homework	70%	Encouraging independent learning	80%	7.07
Reading engineering-related texts	90%	Content-based learning	40%	35.35
Learning technical vocab when you are reading or listening	90%	Teaching jargon in context	30%	42.42
Learning technical vocab by memorizing a list of individual words	14%	Teaching jargon via drilling and memorization (GTM/Audio-lingual method)	70%	39.59
Practicing professional writing (email, cover letter...)	75%	Authentic writing	60%	10.60

Learning grammar through problem-solving tasks, and role-play	88%	Teaching grammar communicatively	80%	5.65
Translating written passages	44%	Teaching through translation	30%	9.89
Being taught by your English and subject content teachers at the same time	60%	Pair teaching	90%	21.21

To approach this RQ an identification of engineering students' language needs as well as their motivation to learn English in an ESP class is necessary. Also, understanding what employers expect from these students in the work environment will be a key determinant to adjust the content of ESP course with the specific needs of the target situation (R. West, 1994).

- What are the primary language skills and components to be developed in the ESP course?

Looking at the most and least important perceived language skills and components by the different stakeholders in Table 1, it turns out that it is hard to determine the fundamental English language skills to be included in the ESP classes within the higher specialized institutions participating in this study. Indeed, the contradictory figures display a divergence between the multiple stakeholders regarding what language skills should take priority to be developed during the ESP classes so as to ensure engineering students' mastery of the abilities needed in the target situation.

In light of this lack of consistency, it was judicious to direct our attention towards the most objective and product-oriented needs
i.e. the language skills that are deemed necessary for the context in which engineering students will use English. These necessities will be better perceived by the in-service engineers who can precisely define the abilities engineering students must have in order to survive in their future work environment. Undoubtedly, these necessities will be better perceived by the in-service engineers who can precisely define the abilities engineering students must have in order to survive in their future work environment.

According to table 1, it can be noticed that in-service engineers almost agreed on all the skills to be important. However, the highest priority was put on the productive skills. Indeed, 100% of in-service engineers considered speaking and writing to be very important. While listening and pronunciation were perceived to be the least important language skills and components overall, technical vocabulary was deemed a very important component by 92% of participants. For a better understanding of these results, it was seen of paramount importance to break down these perceptions into more significant communicative events.

- To what extent are these communicative events important in your current work?

The results, as shown in table 2, show that the communicative events listed above relate to the four English language skills i.e. reading, listening, writing and speaking. Among these skills, writing, listening and speaking skills were ranked to be the most important for in-service engineers. These latter, in free conversations on the sidelines of the interviews, affirmed that the speaking skill was necessary for everyday communication e.g. discussing professional issues formally and informally. In-service engineers stated that the nature of their work necessitated meeting with English speaking top managers, supervisors, customers, suppliers and subcontractors. During these meetings, in-service engineers need to present new concepts, solutions, and alternative strategies. Moreover, they need to give an account of the work in process and any technical difficulties facing them to their English speaking superiors. Similarly, the communicative events related to the listening skill were highly praised by the in-service engineers.

Table 2 shows that listening to English-speaking managers' instructions as well as listening to presentations and discussions in meetings, seminars and conferences are the most frequent communicative activities needed in the in-service engineers' work place. This makes the listening skills go hand in hand with the speaking skills especially that most of the interactions between engineers and colleagues, managers, supervisors, and clients are synchronous i.e. taking place in real time. These professional interactions can either occur physically or via the internet and hence necessitating the mastery of effective listening and speaking skills. The outcome of table 2 also revealed that communicating via emails was the only most frequently used written communicative event by the in-service engineers. According to the in-service engineers, writing emails in English involved mainly English- speaking collaborators i.e. customers, suppliers, and subcontractors, and it was limited to ordering raw materials and spare parts, complaining about delays or defects, and requesting quotes.
Unexpectedly, the communicative events related to the reading skill were perceived as the least frequently used activities by the in-service engineers. When asking the subjects about this marginalization of the reading skill, the majority attributed this to the fact that they made use of translation applications to read technical texts in French instead of English, and even to translate emails from the English-speaking collaborators and partners.
The findings of both tables above represent a view of the entire language skills and components that can

make the framework of our ESP; however, the decision about what contents to be included in the ESP course still depends on a good interpretation of the results. Indeed, the outcome of tables 1 and 2 can be aggregated in three central modules namely English for General Business Communication, English for Daily Conversation, and Engineering English.

It is deduced that engineering students will need to learn General Business Communication in their ESP classes as most of the in- service engineers pointed out that they used emails very frequently to communicate with different personnel. This means of communication falls directly under the responsibility of Business English where engineering students can learn the different types of emails as well as the degrees of formality which tend to be a very crucial hindrance for communication in work settings. In-service engineers asserted that they had to communicate via emails or phones with colleagues, top managers, suppliers, and customers hence using appropriate language while addressing these people would be one of the necessities to be covered in ESP classes. Other points that must be dealt with are the different professional writing genres i.e. Business Letters, Memos, Meeting Minutes, Proposals, Feasibility Studies, Progress Reports, and Social Media. These texts, which are exclusively written for business purposes, are frequently used by engineers in their professional and business correspondence. Therefore, it is a necessity for engineering students to be capable of distinguishing the unique features that differentiate each professional writing genre from other genres.

Accordingly, P'Rayan and Shetty (2008) deem English a 'life skill' that should prepare engineering students to the workplace, and this is exactly what can be interpreted from the in-service engineers' testimonies. In fact, most of the interviewees stressed the fact that English language had become more than just a subject. It is rather a vital workplace skill which will allow engineering students to communicate effectively and confidently in their future professional-world settings. As inferred from the results in tables 1 and 2, English is a necessary tool for in-service engineers in order to build relationships, socialize, and convey new ideas and concepts within their professional entourage. For this reason, it can be said, confidently, that English for Daily Conversation is the second important content that need to be included in the ESP class. According to the in-service engineers, English is mostly used in daily formal and informal conversations. Indeed, from resolving conflicts, and passing by instructing, building trust with colleagues and customers, improving international relationships, to socializing during lunch time, daily conversational English has become a necessity in the professional world. Therefore, the integration of some general English content in the ESP course will enable in- service engineers to be distinct from their counterparts especially that technical skills are, more or less, the same among engineering alumni, which makes daily conversational English an important criterion for engineering students to be distinguished in their future career. The third component that emerged out from the interpretation of the tables above is definitely Engineering English. Indeed, most of the in-service engineers, participating in this study, insisted on the need for technical English. Events such as the negotiation of technical specifications with customers and suppliers, the delivery of oral presentation to report work progress, and the discussion of technical matters formally or informally got a higher mean, as shown in table 1, and hence compelling the engineering students to familiarize themselves with engineering English if they yearn for a potential successful career at a competitive rate. Also, these results send a clear message to EFL teachers who are in charge of teaching ESP classes to start familiarizing themselves with engineering content. In fact, EFL teachers who intend to teach ESP classes must equip themselves with an adequate amount of technical knowledge that will enable them to integrate extracts from authentic technical texts and listening in their ESP course. To this end, the EFL teachers are supposed to start research and personal development as well as cooperating and coordinating with specialty content instructors. Another suggestion for EFL teachers to compensate their lack of technical knowledge would be 'Pair teaching' i.e. having both EFL teachers and specialty content instructors in the same ESP class at the same time. However, this suggested teaching technique together with other potential techniques should not be implemented in the ESP class without an identification of the learning preferences of the engineering students.

➢ **Research question 4:** What are the most favored learning modalities of engineering students in an ESP class?

According to Reid (1987), the course success is definitely influenced by the identification of the learning

preferences of learners and employment of suitable teaching techniques. RQ 4 stipulates that ESP classes cannot be engaging to the engineering students if the EFL teachers are not aware of the preferred ways of their students to learn English.

- How do you prefer to learn in your ESP class?
- What are the teaching techniques that you use most in your ESP class?

ii   The data on table 3 reveals that engineering students privileged different learning modalities as favorable for their learning process. In fact, engineering students' responses stressed how the learning techniques were interlaced and complementary in their role of facilitating the learning of ESP.

As shown in Table 3, engineering students ranked discussions, simulations, and role-plays, the most preferred learning methods to be implemented in their ESP course. The common point between these activities is that they force engineering students to speak. This observation perfectly relates to the findings in table 1 where engineering students perceived speaking as the most important skill to be included in their ESP course. The students also expressed their preference towards the implementation of audio-visual materials i.e. audios, videos, and slides. Lecturing was an unexpected mismatch between the engineering students and EFL teachers' responses as the results above show a very high standard deviation (28.28). Indeed, 77% of learners believe that lecturing is a good instructional method in the ESP class whereas only 30% of EFL teachers approved this point of view. This disparity can be explained by the common belief among EFL teachers that teaching talking time should be reduced and more learner-centered teaching methods should be valued.

Another interesting result is the engineering students' emphasis on project-based activities namely case studies, project work and presentations. However, the only issue with these activities is the limited technical knowledge of the EFL/ESP teachers. This is why 90% of EFL teachers, according to table 3, stressed the importance of pair teaching so as to compensate this lack of subject knowledge. The need for technical knowledge can also explain the higher standard deviation of content-based learning activities e.g. reading engineering-related texts (35.35), and learning technical vocabulary in context (42.42). Indeed, 90% of learners prefer to learn technical vocabulary by reading technical documents or listening to extracts. On the other hand, 70% of EFL teachers favor the teaching of jargon through drilling and memorization.

Clearly, EFL teachers possess a higher language proficiency, and appropriate language teaching pedagogy. They also encourage communicative language learning through the adoption of free practice speaking activities as shown in table 3 where 90% of EFL teachers prefer to use discussions and simulations in the ESP class so as to enable engineering students to interact meaningfully and creatively in the target language. The low standard deviation of engineering students' learning preferences namely the practice of speaking through discussions (2.82), the learning of language components through games (6.36), and the learning of grammar through problem-solving tasks and role-play (5.65), is representative of the awareness of both learners and teachers vis- à-vis the importance of teaching ESP in ways that are accessible to all learners and which provide learners with opportunities to better prepare their English for workplace use in a fun and stress- free environment. Engineering students were also in favor of learning in a collaborative and independent manner as 80% of them opted for pair and group work, and 70% stressed the importance of autonomous learning through homework, and extensive reading.

Another important learning structure that unified learners and teachers' preferences was the teaching of ESP components through role-plays (STDV 1.41). This shows that engineering students expect to apply content and to practice the kind of language that is required in the target situation.

What can be deduced from the outcomes of table 3 is that both engineering students and EFL teachers prefer different and common learning structures to be implemented in the ESP course. The results call attention to the significance of adopting diverse instructional techniques in an ESP class that, by its nature, involves a wide range of variables that should be observed carefully namely learners' styles, needs, and abilities, target context, , and the teachers' professional attributes.

This is in line with Prabhu's (1990) belief that there is no best method for language teaching i.e. any method can be used in the ESP class if it manages to relate learners' wants and expectations with the target context's necessities. However, the findings of RQ 4 revealed a serious issue regarding the teaching of ESP. Unlike

EFL and ESL teachers, ESP practitioners need to integrate both content and language; the thing which requires them to learn the language and communication patterns of the target discourse. This incapacity of understanding the types of tasks learners are expected to deal with in their future jobs was evident in EFL teachers' reluctance to adopt content-based teaching methods and authentic materials.

A suggested solution for EFL teachers to overcome this issue would be the collaboration with a community of practice which was defined by Lave and Wenger (1991) as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly". This means that the EFL teachers, who are in charge of conducting ESP classes, are required to involve specialty content instructors and in-service engineers in order to primarily understand the specific communicative tasks that learners will need to perform in their future workplace, and then use this expertise to develop adequate and authentic instructional methods such as role-plays and the reading of subject-related passages.

It is universally acknowledged that the teaching of ESP falls under the competence of an EFL teacher rather than a subject matter teacher (Hutchinson and Waters, 1987). However, subject matter teachers can be also converted to ESP practitioners if, as Byron (2000) suggests, they collaborate, in their turn, with EFL teachers in order to compensate weakness of proficiency knowledge.

Conclusion

The current study was an attempt to analyze the needs of engineering students from the perception of various stakeholders. The findings revealed the importance of the integration of the four skills. However, speaking and listening were ranked the most important skills for in-service engineers. Additionally, the current study recommended the incorporation of three modules in the ESP course namely English for General Business Communication, English for daily conversations, and Engineering English. Indeed, few studies collected data about the needs of engineering students from multiple informants. Kaewpet (2009) investigated the ESP needs of Thai civil engineering students. During the data collection process, Kaewpet interviewed in-service engineers, subject matter instructors, ESP teachers, alumni, and industrials to finally suggest that reading was the most needed skill. A similar study, involving multiple stakeholders, was conducted by Kim (2013). This time the findings valued the importance of including business and engineering English in the ESP course. What can be concluded then from the current study together with other researches on needs analysis is the complexity of forming generalizations about what should be included in an ESP course, who should teach ESP, and how it should be taught as many variables are intertwined and uncontrollable namely the high subjectivity of learners' wants, the conflicting expectations of multiple stakeholders, and the ever-changing necessities of the target context.

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