

## Engineering students' needs in the design of an English for Specific Purposes reading course

### Necesidades de los estudiantes de ingeniería para el diseño de un curso de lectura en inglés con propósitos específicos

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#### Abstract:

In particular, English has become a universal language all over the world and has had a huge impact on several academic and professional fields. Therefore, not only has the teaching and learning of English as a foreign language (EFL), gained importance, but in particular, English for specific purposes (ESP). This article presents a case study that explores and identifies engineering students' needs and demands using a Needs Analysis that involves interviews and surveys to design an ESP Reading Course. This inquiry included identifying needs to design an ESP course that may provide students with the essential tools in order to understand, and manage accurately, specialized information, which is relevant for their professional development.

#### Keywords:

*Analysis, course, design, engineering, ESP, needs.*

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#### Resumen:

En particular, el inglés se ha convertido en un idioma universal en todo el mundo y ha tenido un gran impacto en varias áreas académicas y profesionales. Por lo tanto, no solo ha ganado importancia la enseñanza y el aprendizaje del inglés como lengua extranjera (EFL), sino que también, el inglés con propósitos específicos (ESP). Este artículo presenta un estudio de caso que explora e identifica las necesidades y demandas de los estudiantes de ingeniería mediante un Análisis de Necesidades que involucra entrevistas y encuestas para diseñar un curso de lectura con inglés para propósitos específicos. Esta investigación incluyó la identificación de las necesidades para diseñar un curso ESP que pueda proporcionar a los estudiantes las herramientas esenciales para comprender y emplear con precisión información especializada, que es relevante para su desarrollo profesional. .

#### Palabras Clave:

*Análisis, curso, diseño, ESP, ingeniería, necesidades.*

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#### INTRODUCTION

English has become a universal language and has had an enormous impact, especially, on several academic and professional areas which require English for specific purposes (ESP). In this respect, Butler-Pascoe (2009) comments that nowadays, with the emergence of English as the prominent language in our increasingly global and technological society,

the implementation of ESP has assumed a sense of necessity, especially in countries that are trying to reform how students learn and perform English. A specific case of this is the field of engineering. Numerous researchers have highlighted that the English language plays an important role in educational and professional development in the engineering field. For instance, Pritchard and Nasr (2004) have pointed out that engineering learners need ESP to understand specialized texts in their field.

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In international organizations and publications in the engineering field, English is considered the most employed language. Therefore, reading emerges as a crucial skill that needs to be encouraged to provide students with essential technical vocabulary and language. Tsai & Chang (2014) affirm that the fundamental competence to engage professional knowledge in the academic context and their future career is reading in English because many authentic schoolbooks and data related to advanced technology have been published in English.

Nevertheless, most engineers whose native language is not English often face some difficulties in their professional context. Apart from having to build their expertise in engineering, it appears that in most cases engineering students are unable to access information in English. The reason for this is that their skills in reading in a foreign language are not sufficiently developed to comprehend the specialized and technical texts in their field. As a result, some experts such as Joesba and Ardeo (2005) argue that engineering students ought to be taught these specific English skills which will become valuable assets not only in their academic settings but also in their future careers as professionals (in Hyo Kim, 2013).

ESP courses in the engineering field are expected to help future engineers to cover their specific needs in the acquisition and comprehension of the technical variations in their field of the English language. These types of courses are considered to provide students with the necessary tools to address their essential needs to develop specific skills for specialized contexts in the target language (Hossain, 2013).

However, to develop a tailor-made ESP course, it is important to know the students' needs through the implementation of a prior Needs Analysis administered to the participants. This task is carried out to understand the strengths and challenges in students' language learning to implement the appropriate methods, competencies, objectives, aims, and materials for the design of the course.

Thus, the purpose of this mixed-method case study was to identify engineering students' needs and demands using a Needs Analysis which involves interviews and questionnaires as a first step to designing an ESP reading course for the engineering language center of a Technological university in Mexico.

## **BACKGROUND**

### ***The emergence of ESP***

Over the years, the term language for specific purposes has emerged regularly in the literature related to English language teaching. ESP is commonly used to refer to the teaching of English for a special purpose (Mackay & Mountford, 1978). It may be said that to obtain a job placement or to develop academically in a specific field, it is important to cover the major skills related to that field. But with the crucial increasing employment of English around the world in several fields and areas, there has been a notorious need for the implementation of

English courses that cover certain learners' needs. These ESP courses are expected to help students to perform their career activities in a global way (Hyun Hyo Kim 2013). Saying this, ESP courses may be said to be focused on specific learning aspects that students demand in a given area or field.

### ***Characteristics of an ESP Course***

For a long time, there has been, a discussion related to the design of ESP courses and questions were raised regarding the specific situation in which language is employed and how they may generate situational or subject-specific language (Mei-yan & Chang, 2010). Furthermore, Mei-yan and Chang (2010: p. 170) argue that:

There is a restriction of language choice and a certain amount of specialist lexis. The acquisition of this restricted, specialized language, first of all by teachers in order to teach it, and its subsequent transversals to the learners, has created a learning dynamic very different from that of mainstream ELT.

The first definition for ESP was stated as courses which are those where the syllabus and materials are determined by the prior analysis of the communication needs of the learner (Munby, 1978 in Mei-yan & Chang, 2010). Another concept for the ESP course was provided by Robinson (in Mei-yan & Chang, 2010), in which she defines it as a purposeful course aimed at the successful performance of occupational or educational goals. These courses are based on a rigorous needs analysis of students. To sum up, ESP should be based on an investigation of the purposes of the learner and the set of their communicative needs (Mei-yan & Chang, 2010).

According to the above-mentioned definitions and concepts, special attention is paid to learners' needs, which allows for the distinction between ESP and general English (GE). Thus, ESP assumes the task of preparing students to develop the main skills specified in their major. This means that ESP teaching includes not only language knowledge, but also subject knowledge concerning their specific areas of study such as computer, mechanics, electronics, biochemistry, business, and so on (Mei-yan & Chang, 2010). Once the content has been selected, the design can be carried out.

### ***How to Design an ESP Course***

As this inquiry has to do with engineers, it is linked to the point that Mackay and Mountford (1978) identified that English for science and technologists as one of the most relevant subdivisions in the area of ESP. It is essential to take into consideration the main factors that have to be included in the design of course material which has to be relevant to the learners according to their field. Mackay and Mountford (1978: p. 6) state that:

We shall consider the role of English for non-native speaking scientists or technologists, and having done that we will specify the factor involved in the design and planning of courses. The

first major step is to identify the needs of the specific group of learners and the educational and curriculum setting into which teaching of English must fit. Such information is essential as a background to the more directly linguistic considerations affecting course content. That is, we cannot decide what we are going to teach until we know to whom and why teaching is required.

Moreover, it has been stated that English is now established as the principal international language of science. It is considered that more than half of engineering literature is written in English and more than half of the world's professional engineers are not able to read English (Mackay and Mountford, 1978). This means being able to read the increasing proportion of textbooks in English is obligatory for scholars. Furthermore, success in graduate work is becoming more and more related to the ability to read the appropriate literature in English and to take part in international conferences where the greater part of the contracts is signed in English (Ewer and Latorre, 1967, in Mackay and Mountford, 1978).

According to Mackay and Mountford (1978), the design of an ESP course has to involve different factors such as sociological, linguistic, psychological and pedagogic. Firstly, in the sociological factor, it has been mentioned that the initial step is to acquire information about the kind of learner for whom the program is to be developed and the uses to which he will be required to put English. This means that it is important to identify the type of student and his needs into the social aspect to cover his demands as well as knowing his characteristics and his requirements. Secondly, the selection of the linguistic content of the language to be used for particular purposes depends on an adequate and appropriate description of the language characteristics that the learner is required to handle. In other words, the linguistic factor has to do with the correct selection of the content from the language to cover the learner's needs and demands regarding his requirements in their context and field (Mackay and Mountford 1978). A third aspect is the psychological factor in which the...

...course materials that are designed within a framework of structural linguistics tend to employ the operational tenets of behaviourist learning theory. This involves an emphasis on the formation of 'correct' habits, the ability to compose correct sentences through a [sic] knowledge of the language system for which drills, and exercises are devised. This is usually achieved by a situational presentation in order to make the language meaningful.

(Mackay and Mountford, 1978: p. 8)

Finally, pedagogic factors have to do with being clear about what language skills are being focussed on or need to be focussed on, in order to devise pedagogic procedures that will actually

develop such skill (Mackay and Mountford, 1978). This means that it is important to know what skills are taught, in which order and how the relation between these skills is going to be presented and trained. Moreover, this focuses on one skill and develops it as much as possible to allow learners to employ it accurately.

## THE STUDY

### *Purpose and context*

The purpose of this study consists of identifying engineering students' needs and demands by employing a Needs Analysis that involves Interviews and surveys to design an ESP Reading Course. This inquiry included the identification of needs to design an ESP course that may provide students with the indispensable tools to understand, and manage accurately, specialized information, which is relevant for their professional development.

This study was conducted in the Language Centre of a Technological University, which is an institution of higher technological education in Mexico. All of the students, who are enrolled on a course in this University, must accredit five levels of English (or French) and acquire a B2 level according to the common European Framework of Reference (CEFR). At the end of these five levels, students are allowed to receive their Certificate of Release, which is part of the mandatory requirements to carry out the formalities of qualification. The Technological University offers language courses in English and French.

### *Participants*

This study involved originally 27 students (ages ranged from 18 to 30) from different engineering fields. The participants in this study were enrolled in the fourth level of English, at the Language Centre of the Technological University in Mexico in the period August-December 2017. A quantitative open-ended questionnaire was administered to these 27 students to identify some of their needs and demands with the aim to select the most suitable participants for the study (six participants). The six designated students to be the participants for this study (2 women & 4 men) were interviewed in a qualitative semi-structured interview that consisted of eighteen questions.

### *Method*

This inquiry was an exploratory case study focused on identifying engineering students' needs and demands to design an ESP reading course. Through case studies, it can be possible to understand situations in ways that are not always comprehensible into statistical analysis (Cohen et al, 2007). Furthermore, Robson (2002) supports the previous idea, since Case studies work is based on analysis rather than statistics.

Case study was selected since the purpose of this study was to investigate informants' needs and demands when learning

English without interfering in their perceptions and opinions. In addition, according to Yin (2003), the exploratory case study “is used to explore those situations in which the intervention being evaluated has no clear, single set of outcomes” (in Baxter & Jack, 2008 p. 548). This means that the inquiry may lack definite products.

The nature of this case study was based on a mixed-method research paradigm. On the one hand, a quantitative method was employed since it focuses on collecting statistical data. A questionnaire was applied to students to select the participants, taking into account how many students have needs related to English learning through an ESP course. In Cohen et al’ point of view (2007) quantitative methodology does not contemplate the emotions of the people in a study. Moreover, Aliaga and Gunderson (2002) state that quantitative research involves the explanation of the phenomena by collecting numerical data that is analyzed by using mathematical methods (in particular statistics). On the other hand, a qualitative research approach was employed also since the inquiry explored engineering students’ perceptions and opinions about their needs regarding English for specific purposes when reading specialized texts in their academic field. Moreover, qualitative methods emphasize mainly the kind of evidence (what people said, what they do) that will allow you to appreciate the connotation of what is going on. Their strength is that they can brighten issues and turn up likely explanations: crucially, a pursuit of meaning (Gillman, 2000, in Rodriguez Olivares 2013).

Furthermore, this research was based on the interpretation of the findings obtained from students’ needs and demands, for this reason it was considered appropriate to employ a qualitative method.

Overall, this study was based on both quantitative and qualitative methods since this study sought statistical aspects such as the number of students who expresses needs regarding learning English for specific purposes. It also refers to a specific group of students, as well as their thoughts and perceptions.

## FINDINGS

This section aims to explain and describe the main categories that emerged from the analysis of the data collected from the answers provided by the informants in the interviews.

### *The importance of the implementation and practice of specialized reading comprehension*

The third category was emerged from the comments from participants related to different aspects in which the importance of the implementation and the practice of specialized reading comprehension is highlighted. The second participant states that understanding what she needs to read is one of the most important factors to learn a second language:

Bueno yo considero que poder entender cuando se lee  
NV/Bio/02/Q1

Then, reading comprehension emerged as one of the main factors in learning a second language. Furthermore, the same participant comments that in the future she wants to be a researcher so one of her main needs regarding second language learning is that most of the relevant books related to her field are in English:

...pues al menos en mi caso yo quiero ser investigadora, entonces pues los libros la mayoría de libros relevantes de... al menos de mi carrera, muchos están en inglés.

NV/Bio/02/Q1

So, reading comprehension plays an important role within the engineering students’ needs regarding second language learning. To this, the first participant adds that her needs are regarding the practice of specialized readings since most of the texts related to her field are in English:

Con respecto a mis necesidades... Sobre todo, son la práctica de lecturas porque en lo que concierne a mi carrera la mayoría de los textos, sobre todo de biología y bioquímica contienen muchas palabras en ese idioma, en inglés.

GA/Bio/01/Q2

The third participant agrees on the previously mentioned explaining that his needs are focused on his academic and professional field since in engineering they have plenty of texts in English which are focused on specific and relevant topics for them:

Mis necesidades son básicamente enfocadas en mi carrera y área laboral ya que dentro de ingeniería tenemos muchos textos que son enfocados a un tema en específico que nosotros necesitamos y se encuentran en inglés.

PA/Ind/03/Q2

The fourth participant also agrees on the need and importance of specialized reading comprehension regarding a second language learning adding that in his field they employ several texts in English and they need to translate them to understand:

Más que nada porque mi carrera se utilizan... ..textos en inglés que luego tienes que traducirlos...

PP/Comp/04/Q2

In addition to this point of the importance of specialized reading comprehension practice, the fifth participant argues that in his field they have to read manuals in English and he states a need to understand them:

...a mi carrera se le atribuye muchos manuales, pero la mayoría vienen en idioma externo al español vienen en inglés... para poder comprender, más que nada, ese texto.

IM/Ind/05/Q2

The following aspect in which this category was highlighted was the reasons why engineers need English. The second participant mentions that in some cases engineers are asked to carry out researches and they have to justify them by employing information from relevant books which are in English:

...hacer investigaciones más profundas, pero bien justificadas sobre algún texto que ya esté antiguamente, pero que por lo general está en inglés.

NV/Bio/02/Q3

Furthermore, the third participant reaffirms that engineers need English since it is basic. This means that files or relevant texts focused on their professional field are in English.

Porque es básico, tanto existe en los que ya mencioné: archivos o textos que son enfocados en nuestras áreas...

PA/Ind/03/Q3

Additionally, the fifth participant besides supporting the same ideas mentioned by the other two participants that engineers need English to deal with aspects such as reading manuals, articles and texts in English, he also mentions that if someone wants to take advantage of people who only read in Spanish, it is necessary to work on specialized reading comprehension in English:

Yo considero que lo necesitamos bastante para todos los aspectos que tengan que ver con maquinaria, manuales, etcétera... Entonces la mayoría de los textos o artículos... investigativos sobre esta... estas áreas vienen en inglés y si tú quieres adelantarte a aquellos que sólo leen textos en español tienes que comprender un idioma inglés para poder buscar textos que aún no salen en ese idioma, en español.

IM/Ind/05/Q3

It is important to remark that this category, was stated by most of the participants taking into account different aspects. The second participant points out that one of the most important engineering students' demands is reading comprehension due to by this means they obtain veridic information that may be used for researching:

Pues más que nada... en la lectura porque pues en la lectura sacas toda la información y tiene que ser basada en algo verídico...

NV/Bio/02/Q4

The fourth participant complements the previous comment by saying that his main demand as engineering student is to be able to understand technical readings such as language programming manuals since most of them are in English:

Mi principal demanda es para poder comprender lo que dicen los manuales de los lenguajes de programación porque todos están en inglés y necesito a veces sacar... este, cómo hacer algún programa con determinado este... ¿cómo le diría? proceso y necesito leer los manuales y todos están en inglés

PP/Comp/04/Q4

In addition, the fifth participant argues that in his opinion, one of the main engineering students' demands may be reading comprehension since a text is given before a conference, a lecture or even in a business meeting, it will be important to understand the information given in English to avoid any mistake:

...también lo que viene siendo la lectura porque si es este... si me dan un texto a leerlo previo a la plática o a una conferencia o incluso alguna junta de negocios tengo que saberlo comprender...

IM/Ind/05/Q4

Regarding the importance of reading skills, the fourth participant comments that these skills may help to understand in a better form the texts:

...también te ayudan a comprender mejor los textos...

PP/Comp/04/Q5

The following participant complemented the previous mentioned saying that reading skills are important since most texts are in English and it is important to understand exactly what the information is about to carry out what they as engineers need:

Porque este... como ya había mencionado todos los textos que a veces uno maneja vienen en inglés, éste... y pues necesitas comprender exactamente lo que te explican porque si no, no habría alguna manera de hacer lo que necesitas.

AM/Comp/06/Q5

Then, reading comprehension emerges as one of the most important reasons to develop reading skills in English. Moreover, another important aspect to mention is that the implementation and practice of specialized reading comprehension is one characteristic that English courses need. Regarding this, the first participant argues that the previous courses she has taken need the implementation of the reading comprehension activities.

...más cuestiones acerca de lecturas, lecturas de comprensión...

GA/Bio/01/Q6

Furthermore, the same participant states that she needs to learn new techniques regarding reading speed and reading comprehension:

Necesito aprender... nuevas técnicas... ...como tal vez leer un poquito más rápido, en la comprensión lectora, sobre todo.  
GA/Bio/01/Q8

Regarding the same matter, what engineering students need to learn, the second participant argues that she needs to understand texts and sometimes she becomes confused by the readings:

...para poder entender muchos textos porque a veces se me complica... ...y como que ya me confundió en todo el texto.  
NV/Bio/02/Q8

The third participant complements the previous comments by mentioning that he needs to learn how to interpret or understand specialized texts:

...poder interpretar textos específicos...  
PA/Ind/03/Q8

The fifth participant adds why he needs to learn is new authors as well as better techniques in reading:

Respecto a la lectura una mayor cantidad de... ¿cómo podríamos llamarlo?, autores y pues mejores técnicas para continuar leyendo...  
IM/Ind/05/Q8

Then, the implementation of reading comprehension emerges as one of the main aspects engineering students need to learn. In the following aspect, engineering students provided similar comments and points of view regarding the expectation they have regarding an ESP reading course design. The second, the third, and the fourth participants agree on the same idea that they expect the ESP reading course provides better reading comprehension practice:

Pues poder entender mejor los textos...  
NV/Bio/02/Q10

Que me ayudara a mejorar mi comprensión  
PA/Ind/03/Q10

...un curso que en el que se te enseñarán bien lo que es la comprensión lectora...  
PP/Comp/04/Q10

Then, the development and practice of reading comprehension emerges as the most important expectation from an ESP reading course. Afterwards, four out of six participants argue the same comment regarding the most important skill for engineering students. The four participants agree on the most relevant skill is

the reading comprehension. The following are their comments in order to support the previous mentioned:

Porque básicamente la lectura la ocupamos casi todos los días...  
GA/Bio/01/Q11

Más que nada la lectura...  
NV/Bio/02/Q11

En mi caso lectura... ...porque dentro de mi carrera es lo que más utilizamos tanto la lectura de los textos, su interpretación y su comprensión...

PA/Ind/03/Q11

La lectura porque pues como ya lo dije es la forma más fácil de repasar...

IM/Ind/05/Q11

In this form, practicing reading comprehension emerges as the most important skill for engineering students. Moreover, four of the six participants state what they need within the reading skill. And all of them agrees on the development and practice of reading comprehension. The next are the ideas expressed by the four participants:

Necesito... comprender un poquito más las lecturas...  
GA/Bio/01/Q12

Por ejemplo, no sólo leer sino entenderlo...  
NV/Bio/02/Q12

Bueno, en lectura yo necesito la comprensión de los textos que vienen en mi carrera.

PP/Comp/04/Q12

Pues... lecturas en base a mi carrera, a mi área...

AM/Comp/06/Q12

As a result, the practice of reading comprehension appears as the main need that engineering students have within the reading skill. The following aspect was highlighted by two participants regarding the implementation and practice of reading comprehension in the aspect of how an ESP reading course may enhance technical vocabulary learning. The two participants agree on the aspect that readings help them to improve the comprehension and allow them to obtain new knowledge from specialized texts:

Porque al ampliar mi conocimiento podría seguir leyendo indagando en más información respecto a mi carrera...

PA/Ind/03/Q15

Pues... sería mediante la práctica este... practicarlo o hacer lecturas...

PP/Comp/04/Q15

Furthermore, another important aspect that in which the participants highlight the implementation of reading comprehension is in the impact of engineering students' needs in the ESP reading course design. Related to this aspect, the second participant mentions that it would be interesting that the

design of this course involves what students considered necessary according to their academic fields. She states that students need to read relevant articles in their academic field, this is because they are not only focused on books but also in articles and research papers that exist in English:

...a leer estos, los artículos más relevantes que puedan encontrar en sus carreras... Sí, porque a veces no solo nos enfocamos en libros, también somos mucho de leer artículos o investigaciones muy relacionadas a estas. Y pues la mayoría de investigadores muy muy buenos son estadounidenses.

NV/Bio/02/Q17

The third participant complements the comment previously mentioned by saying that engineering students' needs would impact in a form that are taken into account in the design of the course, so this may involve specific topics and go straight to what is required. In this case, the course might be focused on specialized texts:

Impactaría de la forma en que, al yo decir mis necesidades, se podrían enfocar ya en temas específicos y no indagar en qué necesitan y que no sino ir directamente a lo que se requiere, en nuestro caso textos específicos...

PA/Ind/03/Q17

Then, the implementation and practice of reading comprehension may fill one of the main engineering students' needs that should be taken into account in the design of an ESP reading course to satisfy students' demands. The following aspect in which the informants highlighted the category of implementation of specialized reading comprehension is the activities in an ESP reading course design. The first participant mentions that the implementation of specialized, scientific readings that are related to their academic studies may be important and relevant in the ESP course design:

La implementación de lecturas sobre todo porque... Más que nada científicas porque por ejemplo cuando estamos... bueno de acuerdo con la carrera la mayoría de estas ocupan lenguaje en inglés y textos científicos aplicados al inglés.

GA/Bio/01/Q18

The following participant suggests readings, some reading circles to share what each student comprehends from the text:

Pues ¿actividades?... La lectura y como le decía, practicando lo que... platicando con los demás qué es lo que entendiste, como un círculo de lectura...

PP/Comp/04/Q18

The next participant agrees on what was mentioned by the previous participant, and states that the students must be provided with a books catalog that they may read. Moreover, he

argues that a reading circle may be implemented to discuss what they have learned from some books:

Que se le dé al estudiante un catálogo de libros que pueda leer... Me gustaría tener algún tipo de círculo de lectura, tal vez en el que podamos comentar sobre lo que hemos aprendido sobre cierto libro o algo así...

IM/Ind/05/Q18

Additionally, the sixth participant complemented the comments provided by the other participants by stating that several readings must be implemented, some examples of readings that he suggests are scientific texts and books related to their field. This is to make students develop reading comprehension skills:

...yo creo que serían muchas lecturas... Pues como textos científicos enfocados, a lo mejor libros que traten sobre eso... que tú los puedas ir comprendiendo y pues vas obteniendo aparte el conocimiento.

AM/Comp/06/Q18

As participants suggest, the importance of the implementation and practice of reading comprehension has been notoriously presented in several aspects such as the important factor to learn a second language, the students' needs and demands regarding the second language learning, the reasons why engineers need English, the importance of reading skills, the needs of previous English courses, what students need to learn in English, engineering students' expectations from an ESP reading course, the important skills for engineering students, how an ESP reading course may enhance students to learn technical vocabulary, the impact of students' needs in the ESP reading course design and the relevant activities that may have to be involved in the ESP reading course design.

#### **Technical language: vocabulary**

In the fourth category, the importance of the acquisition of technical language, in most cases vocabulary, was highlighted by the participants. This category emerges in different aspects, the fourth participant states that the learning of technical vocabulary is important as it is part of his need in the second language learning. He also states that it is sometimes difficult to understand some text because the lexis is very specialized and complicated:

...mi carrera se utilizan muchas palabras y textos en inglés que luego tienes que traducirlos pero como tiene algunas palabras técnicas como que no los comprendo muy bien.

PP/Comp/04/Q2

The following participant agrees on the same aspect as the fourth participant since he considers relevant the learning of technical language because it is required in his academic and professional

field, he also states that this is an important need regarding the second language learning:

Sí necesito un lenguaje un poco técnico debido a que a mi carrera se le atribuye muchos manuales... .. entonces entré mejor comprenda yo un lenguaje técnico de inglés o incluso el coloquial me hace unas bases fuertes para poder aprender ese... para poder comprender...

IM/Ind/05/Q2

Then, the learning of technical language such as vocabulary emerges as one of the main needs of students when learning a second language. The next participants, both the first and sixth agree on technical language such as vocabulary learning is one of their main demands as engineering students. The following extracts show what students state regarding their demands about learning a second language:

Aprender más vocabulario y lenguaje técnico

GA/Bio/01/Q4

En mi caso que esté enfocado hacia mi carrera, que ocupe lenguaje que yo estoy ocupando actualmente, que pues en algunos momentos no lo logro comprender

AM/Comp/06/Q4

In this case, as it has been seen, the acquisition of technical language is involved as one of the main engineering students' demands. Another relevant aspect that was highlighted by three of the participants is that some previous courses that they have taken need to implement technical language that can be useful in the students' academic field. The second participant suggest that some previous courses that she has taken need to expand the vocabulary involving technical terms related to their engineering field:

Bueno pues que amplíen poco más el vocabulario con respecto a las ingenierías

NV/Bio/02/Q6

Moreover, the fourth participant agrees on the previous mentioned, and states that technical vocabulary related to his engineering field must be implemented in the previous courses he has taken:

Pues, con respecto a mi carrera tener un poco más de... utilizar los tecnicismos que se utilizan mi carrera este...

PP/Comp/04

Additionally, the sixth participant reaffirms that the previous courses he has taken need more technical language related to other fields.

Pues un poco más de lenguaje específico en cuanto a cualquier otra área

AM/Comp/06/Q6

In this way, technical language: vocabulary emerges as one of the main aspects that previous English courses need to implement. In the following stage, four of the participants agree on highlighting the emergence of the category "technical language: vocabulary" as something that is relevant for them as a need to learn in English. The following are the extracts that support the previous mentioned about what engineering students' needs to learn in English:

Pues aprender más vocabulario para poder entender muchos textos...

NV/Bio/02/Q8

Necesito aprender vocabulario específico de acuerdo a mi área, en este caso ingeniería industrial.

PA/Ind/03/Q8

...yo lo que necesito aprender son... un lenguaje que vaya incluyendo pues tanto medidas... mediciones en el sistema inglés tecnicismos del idioma...

IM/Ind/05/Q8

¿Yo? Lenguaje enfocado a mi carrera, más esté... más conocimiento de parte de mía en mi área.

AM/Comp/06/Q8

Then, technical language emerges as one of the main students' needs to learn in English. In the next case, the category "technical language: vocabulary" is highlighted by the informants as one of the most common engineering students' expectations from an ESP reading course. The second participant states that her main expectation is to have a better comprehension of text and expand his vocabulary:

Pues poder entender mejor los textos y pues ampliar mi vocabulario.

NV/Bio/02/Q10

On the other hand, the fifth participant argues that he expects that the ESP reading course focuses on his specific field in general, not only in vocabulary:

Esperaría que ese curso si fuera enfocado al área a la que yo voy a desempeñarme.

IM/Ind/05/Q10

In addition, the sixth participant reaffirms the previous mentioned by the other two participants and argues that he expects that the ESP course should be focused on a specific field and involves technical language, terms, and vocabulary:

Pues que realmente estuviera enfocado a alguna área que ellos propusieran ¿no?, que realmente manejaran todo ese tipo de cuestiones, no sé si decirlo como tecnicismos respecto a la materia.

AM/Comp/06/Q10



Most of the participants' expectations are related to the acquisition of technical language and vocabulary. Furthermore, three out of six participants agree on the same cement that the main engineering students' need within the reading skills is the acquisition of technical language, specifically vocabulary. The following show participants statements to support the ideas previously mentioned:

...dedicarme un poquito más al uso de palabras nuevas y vocabulario empleado en el conocimiento técnico por ejemplo en mi carrera.

GA/Bio/01/Q12

Dentro de estas habilidades, lo que yo necesito es... ...ampliar mi vocabulario técnico...

PA/Ind/03/Q12

...en base a mi carrera, a mi área y pues aprender obviamente el vocabulario...

AM/Comp/06/Q12

Then, the acquisition of technical language emerges as one of the needs within the reading skill. This category was also highlighted by two participants in respect to how an ESP reading course may enhance technical vocabulary learning. The second participant argues that if the course is designed to focus on her field she would learn new words as technical vocabulary in her field:

...yo creo que sería enfocado a nuestra carrera sería pues aprendiendo nuevas palabras en bioquímica porque es lo que normalmente nosotros nos enfocamos en la materia.

NV/Bio/02/Q15

Moreover, the fifth participant complements the idea of the second participant by stating that it would be encouraging that he learns technical words by means of this ES reading course.

Siento que me podrían motivar debido a que sabiendo que... que voy a aprender ya tecnicismos que voy a ocupar en el futuro

IM/Ind/05/Q15

Then, technical language emerges as the main feature in how an ESP reading course may enhance technical vocabulary learning. In the next section, four of the informants highlight "technical language: vocabulary" as one of their needs that have a great impact and have to be considered in the design of the ESP reading course. The four participants agree on the implementation of the technical language employed in their engineering field. The following extracts support the previous statement:

...tendría que implementar el lenguaje y vocabulario empleado en la carrera para poder llevar a cabo el curso. Que el curso contenga los ¿cómo se dice? las especificaciones que necesita mi

carrera por ejemplo el vocabulario y sobre todo los tecnicismos que ocupamos.

GA/Bio/01/Q17

Impactaría de la forma en que al yo decir mis necesidades, se podrían enfocar ya en temas específicos y no indagar en qué necesitan y que no sino ir directamente a lo que se requiere, en nuestro caso textos específicos vocabulario.

PA/Ind/03/Q17

Siento que son bastante importantes, preguntarle a un alumno que es lo que necesita debido a que él es el que necesita el curso, entonces él sabe... pues lo que quiere y pues puede dar bastantes ideas sobre qué es lo que él realmente está buscando de un curso que enseñe un lenguaje o enseñanzas basadas a un propósito específico.

IM/Ind/05/Q17

...por ejemplo, cubrir pues lo que es vocabulario...

AM/Comp/06/Q17

As a result, the implementation of students' needs such as technical language and vocabulary may have a great impact on the ESP reading course design. Finally, the sixth participant make emphasis on the implementation of activities in the ESP reading course such as giving a class as if they teach something about a specialized engineering field in English employing the appropriate technical language:

Pues por ejemplo algún tipo de clase propia del área, pero pues ya impartida con el idioma inglés.

AM/Comp/06/Q18

In conclusion, the category "Technical language: vocabulary" was highlighted by most of the participants in different aspects such as: The needs regarding second language learning, need for previous English courses, main engineering students' demands, engineering students' needs regarding the learning of English, engineering students' expectations from an ESP reading course, engineering students' needs within the skills, how an ESP reading course may enhance technical vocabulary learning, impact of engineering students' needs in the ESP reading course design and the important activities in the ESP reading course design.

### ***The importance of communication in English in the academic and professional field***

In the next category, the importance of communication is powerfully highlighted in several aspects. The category emerges, in first place, from the engineering students' needs regarding a second language learning. The third participant states that his needs are basically focused on his career and work place since in his professional field, most companies required a second language as in this case, English.

Mis necesidades son básicamente enfocadas en mi carrera y área laboral... .. también dentro del área laboral la mayoría de las empresas requieren un segundo idioma, en este caso el inglés.  
PA/Ind/03/Q2

On the other hand, the sixth participant argues that he needs English for academic reasons since his professional studies' bases are in English.

En mi caso por la carrera que estoy estudiando necesito aprender el inglés debido a que las bases de mi carrera son en ese idioma.  
AM/Comp/06/Q2

Then, "the importance of communication in English in the academic and professional field" emerges by students' comments about the engineering needs regarding a second language learning. The following participant mentions that one of the main needs that engineers have is to be able to communicate in English, as it may be considered as the universal language, in some industries and workplaces. Moreover, the importance of communication is also relevant in aspects such as direct contact with bosses and contact with foreign work tools and machinery:

Bueno... el inglés es un lenguaje... Creo que es el lenguaje universal. Entonces, ehh... Comúnmente en las industrias y en el trabajo los manuales que manejamos y las instrucciones que nos dan nuestros jefes son o vienen en inglés porque casi todo, todos los programas y manuales, incluso las maquinas se operan con ese idioma.  
GA/Bio/01/Q3

Furthermore, the second participant agrees to the first comment by mentioning that engineers need English for communicating in their professional field and workplace since some engineers may need it to work abroad:

Bueno pues más que nada en su vida laboral porque muchas empresas lo requieren tanto para poder trabajar en otro país o hacer investigaciones más profundas...  
NV/Bio/02/Q3

Moreover, the fourth participant points out that he needs English since in his professional field some companies and enterprises, which develop the software, are foreign and employ English as a mean of communication:

yo lo necesito para... para los lenguajes de programación y porque la mayoría de las empresas en las que se desarrolla el software son extranjeras y el idioma primordial es el inglés.  
PP/Comp/04/Q3

In addition to the previously mentioned the fifth and sixth participants complement by mentioning that most of the industry

is developed in USA, Canada, and the United Kingdom so the communication must be in English. To finish, the sixth participant states that the main work sources required English, and obtaining a good job requires a second language.

...debido a que lamentablemente la mayor industria de todo eso está más desarrollada en países como Estados Unidos, Canadá e incluso en Reino Unido y esas partes.  
IM/Ind/05/Q3

Ehm... principalmente por fuentes de trabajo. Actualmente pues si quieres tener un buen trabajo necesitas aprender un segundo idioma, pues el inglés es.  
AM/Comp/06/Q3

The importance of communication in English in the academic and professional field emerges as one of the needs of engineers according to the information collected from the participants. Going ahead, the fifth participant points out that communication is one of the main engineering demands since some conferences are in English and students need to communicate employing the language.

Entonces si tomo alguna conferencia en un idioma como el inglés pues voy a necesitar bastante pues... poderme comunicar bien  
IM/Ind/05/Q4

On the other hand, the first and third participants agree on the importance of communication as one of the main needs that English courses that they have taken previously need. The first participant argues that previous English courses need more group communication as well as student-teacher communication:

Ehh... Tal vez, más, este, comunicación grupal entre tal vez alumno y maestro  
GA/Bio/01/Q6

The third participant remarks that the English courses he has taken previously need more interaction as part of the communication between classmates as well as teachers:

Necesitan un poco más de interacción, tanto entre compañeros como entre maestros  
PA/Ind/03/Q6

Furthermore, the sixth participant adds that one of the aspects that he has learned from previous courses is how to express in a more ordinary context, but not in a formal way and employing specific language:

A desenvolverme, pero dentro de un medio más cotidiano, tranquilo ¿no? con la gente, algo no tan formal o en base a alguna área en específico.

AM/Comp/06

Additionally, the third participant points out the implementation of some activities in which the students may employ communication for real life such as performing simulations or situations in which students act out as if they were in a job interview for a company:

...podrías realizar una especie de simulacros o cómo interacciones entre los estudiantes simulando posiblemente, en nuestro caso, una entrevista de trabajo en una empresa...

PA/Ind/03/Q18

### **English Level**

In this category, the English level was highlighted since it was an important aspect to know for the participants to take an ESP reading course. The data collected from participants for this category varies since each participant gives different points of view. The first participant mentions that as it is a specialized course the students must know enough of English to take the course, she states that having a B2 level would be the most appropriate:

Bueno... como ya es un curso especializado ya debemos tener conocimiento del inglés, entonces pues yo diría que un B2...

GA/Bio/01/Q14

The fourth participant shows a similar comment as in the first participant since he considers it important to have a high level and agrees with a B2 English level since the course is with a specific focus it is necessary an advanced level to have a better understanding:

Pues yo creo que un nivel alto, un B2 porque ya como es específico pues ya se necesita un nivel más avanzado de inglés para comprender mejor...

PP/Comp/04/Q14

In addition to the previously presented, the sixth participant reaffirms that it is important to have a good level of English to take an ESP reading course. The participant argues that an intermediate or high intermediate level may be appropriate:

Yo creo que un nivel intermedio... intermedio alto porque pues ya tienes la comprensión y estructura de mucho de lo que es el idioma inglés...

AM/Comp/06/Q14

To support the comment made by the previous participant, the third informant mentions that he considers appropriate an advance – intermediate English level to be able to take an ESP reading course:

Yo considero que sería un inglés intermedio avanzado.

PA/Ind/03/Q14

Moreover, the fifth participant considers that it is necessary to have previous knowledge of the language and a B1 level may be enough to take the course:

Consideró que ya sería un curso B... B1 Porque si es necesario que ya exista un conocimiento previo...

IM/Ind/05/Q14

In conclusion, taking into account the different points of view, most of the participant agrees that students who want to take the ESP reading course must have previous knowledge of the language and be able to manage the language with an average level such as intermediate-advanced (B2).

### **Knowledgeable teacher in English as well as in the specific academic field of engineering**

In this category, all the participants emphasize that one of the most important skills that the teacher who will give the ESP reading course must have apart from a good level of English is to know about the engineering field whose course will be given to. The six informants agree on the teacher who will give the course must be knowledgeable in the academic and professional field of the specific engineering. The next extracts support the idea previously mentioned:

...palabras, tecnicismos muchísimos Entonces si el maestro no los conoce o no los implementa, puede ser que no pueda ayudarme con mis dudas

GA/Bio/01/Q16

También es importante que el profesor tenga conocimientos en ingeniería...

NV/Bio/02/Q16

Que aparte de poder enseñar el inglés tenga también conocimiento dependiendo de la rama a la que se vaya aplicar.

PA/Ind/03/Q16

Pues habilidades... necesitaría tener conocimientos en el área. Ahora sí, como yo necesito algunas palabras técnicas yo creo que necesitaría tener algún conocimiento previo de lo que es la carrera...

PP/Comp/04/Q16

Siento que tendría que tener un conocimiento, no precisamente alto, un conocimiento básico en lo que viene siendo el área ya sea técnica o algo así, para que también cualquier duda que le surja el estudiante el profesor también la pueda comprender.

IM/Ind/05/Q16

Then, the category “*knowledgeable in English as well as in the specific academic field of engineering*” emerges as one of the main skills that a teacher must have in order to give an ESP reading course.

### **Evaluation**

To end, in this last category, three out of six participants agree on the aspect of implementing evaluation activities to notice if students were able to understand the text they were asked to read.

The activities proposed by the participants involve writings such as essays, diagrams, and conceptual maps related to the readings, and also some questionnaires about the texts provided in the course. The following comments are extracts from the three participants who propose these types of reading evaluation that an ESP reading course may implement:

Pues... que hagamos ensayos y no sé algunos cuestionarios para saber si al leer están entendiendo todo lo que se está leyendo.

NV/Bio/02/Q18

...hacer preguntas de lo que viene la lectura y preguntárselas a alguien más o escribir lo que vas a decir en un debate.

PP/Comp/04/Q18

...que escriba un texto similar... que escriba no sé, un ensayo o algo parecido, pero en el que se le requiera usar el vocabulario que acaba de aprender.

IM/Ind/05/Q18

To sum up, in this chapter were explained the most relevant categories which emerged from the data collected in different aspects discussed with the participants. Moreover, the extracts from the participants were added to provide a clearer panorama related to the data and information presented in this chapter to make it easier for the reader to understand each category and the aspects which were involved in each of them.

### **DISCUSSION**

The first category that emerged was Speaking: fluency and pronunciation in which the participants expressed that pronunciation is one of the most important aspects when learning a second language. Among these participants, one suggested that all the skills are important and not only one must be emphasized. Moreover, two out of six stated that also fluency plays a relevant role when acquiring a second language. According to the participants' comments, it is clear that within the language, the aspect of practicing fluency and pronunciation may be the most relevant but also have to be complemented by other skills such as reading, listening, and writing. The importance of the implementation and practice of specialized reading comprehension emerged since the participants stated that one of the main needs is to read specialized texts in English which are related to their field. One participant out of six expressed that she wants to become a researcher so reading specialized books and articles will be relevant in her future. As it has been suggested by the participants, the importance of the implementation and practice of reading comprehension has been notoriously presented in several aspects such as the important factor to learn a second language, as the students' needs and demands regarding

the second language learning, as the reasons why engineers need English, the importance of reading skills, the needs of previous English courses, engineering students' expectations from an ESP reading course, the important skills for engineering students, how an ESP reading course may enhance students to learn technical vocabulary and the relevant activities that may have to be involved in the ESP reading course design. The category of Technical language: vocabulary appeared since the importance of the acquisition of technical language, in most cases vocabulary, was highlighted by the participants. This is because technical language is considered relevant by the participants in their academic field as well in the professional Laboral area as engineers. Furthermore, another relevant aspect that was highlighted by three of the participants is that some previous courses that they have taken need to implement technical language as well as expand the vocabulary involving more technical terms related to their engineering field. Acquisition of language through reading appeared as another category in which participants pointed out that the importance of reading skills reflects when students may acquire vocabulary and learn the language by reading. Moreover, participants argued that the acquisition of second language through reading is one of the most relevant expectations they have from an ESP reading course. The importance of communication in English in the academic and professional field is highlighted by the informants since their needs are focused on their career and workplace because in their professional field, most companies required a second language as in this case, English. Concluding that one of the main needs that engineers have is to be able to communicate in English, as it is considered as the universal language, in some industries and workplaces. English Level, the data collected from participants for this category varies since each participant gives different points of view, but most of the participants mentioned that as it is a specialized course the students must have enough knowledge of English to take the course. Furthermore, all the participants emphasize that one of the most important skills that the teacher who will give the ESP reading course must have apart from a good level of English is to have knowledge regarding the engineering field whose course will be given to, that is how the category Knowledgeable teacher in English as well as in the specific academic field of engineering emerged. Evaluation is emphasized since participants agree on the aspect of implementing evaluation activities to notice if students were able to understand the texts they were asked to read. The activities proposed by the participants involve writings such as essays, diagrams, and conceptual maps related to the readings, and also some questionnaires about the texts provided in the course.

### **CONCLUSION**

This case study explores students' needs and demands regarding learning English for specific purposes by specialized readings. It also suggests what is necessary to include on an ESP course to

enable engineering students to access relevant articles and texts related to their academic area to identify specific information and terminology for their specific purposes. Furthermore, this study may encourage other researchers to develop this kind of study in other fields such as Medicine, Law, Psychology, among others.

The main aspects that were found out during this study were Speaking: fluency and pronunciation in which the participants expressed that is one of the most important aspects when learning a second language. Moreover, the implementation and practice of specialized reading comprehension emerged as one of the main needs since engineering students are required to read specialized texts in English related to their field. Moreover, the importance of the acquisition of technical language, in most cases vocabulary, was highlighted by the participants. This is because the technical language was considered relevant for engineers in their academic field as well as in their professional Laboral area. Participants pointed out that the importance of reading skills reflects when students acquire vocabulary and language through reading. The importance of communication in English in the academic and professional field is highlighted by the informants since their needs are focused on their career and workplace because, in their professional field, most companies required a second language as in this case, English. most of the participants mentioned that, as it is a specialized course, the students must have a good English level of proficiency to take the course. Additionally, all the participants emphasized that one of the most important skills that the teacher who will give the ESP reading course must have, apart from a good level of English, knowledge about the engineering field whose course will be given to, that is how the category Knowledgeable teacher in English as well as in the specific academic field of engineering emerged. Finally, evaluation was stressed since participants agreed on the aspect of implementing evaluation activities to notice if students were able to understand the texts they were asked to read.

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