

BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA

Facultad de Lenguas



***COMPUTER SCIENCE ENGINEERS USE OF WRITTEN AND ORAL GENRES IN
ENGLISH IN THEIR ACADEMIC AND PROFESSIONAL SETTINGS***

A Thesis submitted to the Faculty of Languages

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MAESTRÍA EN LA ENSEÑANZA DEL INGLÉS

By:

VERÓNICA RODRÍGUEZ AMBROCIO

THESIS DIRECTOR:

MTRA. MARIA TERESA FATIMA ENCINAS PRUDENCIO

Puebla, Pue.

JAN 2021

**COMPUTER SCIENCE ENGINEERS USE OF WRITTEN AND ORAL GENRES
IN ENGLISH IN THEIR ACADEMIC AND PROFESSIONAL SETTINGS**

This investigation has been read by the members
of the Committee of

VERÓNICA RODRÍGUEZ AMBROCIO

And is considered worthy of approval

in partial fulfillment of requirements

for the degree of

MAESTRÍA EN LA ENSEÑANZA DEL INGLÉS

Thesis Director



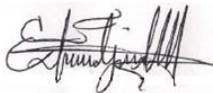
Mtra. María Teresa Fátima Encinas Prudencio

Committee Member



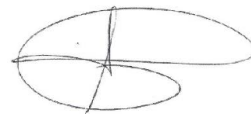
Dra. Verónica Sánchez Hernández

Committee Member



Mtra. Eva Estefania Trujeque Moreno

Committee Member



Mtra. Georgina Aguilar González

Benemérita Universidad Autónoma de Puebla

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COMPUTER SCIENCE ENGINEERS USE OF WRITTEN AND ORAL GENRES IN ENGLISH IN THEIR ACADEMIC AND PROFESSIONAL SETTINGS

ABSTRACT

The aim of this case study was to identify the written and oral genres in English used in the academic and professional settings by the computer science engineers in Central Mexico. The instruments used to collect data, in the academic setting were a focus group of the students and interviews to the professors. In the professional setting, questionnaires and interviews were used to collect data from the alumni about the most common genres used in English in their workplaces as well as interviews to two employers. The findings of this study indicate the written and oral genres used at different stages of computer science engineers development and could be used to design courses focused on English for Specific Purposes at Technological Universities.

Key concepts: Written genres, oral genres, academic setting, professional setting, computer science engineer.

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Computer Science Engineers use of Written and Oral Genres in English in their Academic and Professional Settings

CHAPTER ONE: INTRODUCTION

- 1.0 Introduction
- 1.1 Significance of the study
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- 1.5 Aims
- 1.6 Research questions
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1.0 Introduction

Computer science engineers use different written and oral genres in English for their academic and professional lives. Their perceptions about language needs vary depending on whether they are students or professionals due to specific necessities, requirements and contexts. Engineers' language needs depend on the activities they have to perform and the context where those ones occur. While computer science engineering students need English for their academic purposes; computer science engineers need to acquire English for Specific Purposes to be capable to develop professionally at their workplaces. Therefore, this study attempted to identify the written and oral genres in English used by students and alumni regarding their academic and professional needs as well as the genres that are required first in their undergraduate program and later in their work place.

The study adopted a sociocultural perspective. The case study was carried out with students and alumni from a technological university located in the central part of Mexico who majored in the computer science engineering, and employers from several companies

located around the region. All the participants needed English to perform certain tasks either in their academic or professional settings which varied from writing a report for a class or one report for their bosses at work.

One of the objectives was to understand the computer science engineers' perceptions regarding their English necessities as students and professionals in their specific contexts. Their needs vary depending on the years of experience and the positions they had at their workplaces.

As an English teacher of a technological university I had been always worried about my students' English language learning and the way in which they could apply what they learn in their professional fields. For this reason, I was interested in exploring their professionals' needs regarding the language in order to provide significant tools to students while they are taking their language courses at university. General English courses were not enough for the computer science engineers; consequently, I became interested on English for Specific Purposes (ESP). However, during my masters' studies while reading for my research project I realized that it was important not only to identify the needs but also to know the written and oral genres used by the computer science engineers in different contexts and at the different stages of their professional development.

1.1 Significance of the study

The purpose of this study was to contribute with insights on the written and oral genres used by computer science engineers first in the university and later in their workplaces in order to provide pedagogical suggestions to redesign the teaching of English in technological higher education. Hopefully, the results provide the genres that need to be

developed during their academic formation to be able to perform the tasks that are demanded at the contexts regarding to the foreign language (English).

Another aim of this project was to identify the English requirements of the potential employers. It was important to know what the employers require their employees to do in English to perform different tasks at the companies. To identify and understand this information would be helpful to improve the English programs at the technological universities in which a variety of genres can be included for the academic formation to satisfy professional needs.

1.2 Context of the research

The history of English for Specific Purposes (ESP) started in 1962. Swales began in *Episodes in ESP* in which the main focus was English for Science and Technology in academic contexts. ESP has been analyzed by different authors and researchers. Some of them have focused their attention on English for tourism, businesses, science and technology, medicine and law (Swales & Master, 1980;1998), others have been wondering about how to apply ESP to the different kinds of syllabuses that exist (Hutchinson & Waters, 1987), and some others have developed programs for ESP to different fields (Orr, 2002).

Research has been done in ESP related to needs assessment (West, 1984; Jacobson, 1986; Tarantino; 1988). ESP researchers such as Adams-Smith (1986), Malcolm (1987) and Rounds (1987) focused on linguistic devices and their rhetorical purposes. Other researchers such as Betty Lou DuBois (1980), Zak and Dudley-Evans (1986) and Murray' (1988) studied how to use the computer for communication.

The term *genre* is a core concept in ESP research. It began to appear in the ESP literature because of research done in contrasting linguistic devices among text types. “Morrow (1989) contrasted the use of conjuncts in two genres: business news stories and academic journal articles” (Johns 2011, p.12). In the 80’s a number of ESP researchers investigated genre in different fields (Hopkins & Dudley-Evans, 1988; Tinberg, 1988; Swales, 1981).

In the modern ESP era more research has been done regarding to genre. In 2007, Ken Hyland published “Genre pedagogy: Language, literacy, and L2 writing instruction”. In 2004, Samraj examined the discourse features of graduate student research papers “in order to increase our understanding of this heterogeneous genre and the dimensions along which it can vary across sub-disciplines” (Johns 2011, p.5).

It is important to highlight that since 1990 there is a dominance of “genre” in ESP research. Swales’ genre analysis (1990) initiated with this movement relating the topic to scholars. Benesch (1996), Johns (1997) and Bhatia (1993, 2004, 1987/2007) have done studies of academic genres and they found that “the most intransigent academic issues can be found in novice undergraduate education” (cited in Johns, 2011, p.17). However, not all the research in genres has to be academic, Devitt (2004) considers the genres as “types of rhetorical actions that people perform and encounter everyday in academic, professional, and social interactions”, he analyzes genres like jokes, junk mails, mystery novels and travel brochures.

It has been demonstrated that genre analysis can be completed on genres regarding the professional field. Spinuzzi (2004) has focused his research on the way many workplace genres are designed primarily to mediate activities. Bathia (2008) focuses his studies on

different professional genres and the professional practices that occur in specific professional contexts.

1.3 Background of the researcher

I have been an English teacher for seventeen years and I have worked at the technological university for twelve years. As an English teacher in this context, I have been able to observe that current students at the research context have problems when they are asked to work with a book or an article in English for their content classes. In fact, they have discussed this concern with the English teachers because they have problems translating the information they need due to their lack of vocabulary and language in those genres. Some other students have expressed their concern of their lack of language or skills to understand a power-point presentation in their classes. These experiences have been helpful to identify that students think learning general English for communicative purposes is not enough, they need to acquire the language for their academic and professional lives.

The results of an internal Alumni survey in 2013 at the technological university indicated that these participants have faced problems with the use of English at their workplaces. The participants have shown lack of communicative skills related to their specific field of work. They had problems with the manuals in English; some of them were reluctant to have an interview in English to get a job or a better position. Others had problems communicating in a phone call with an international company. Apart from the survey, an administrator from the technological university who was in touch with the alumni was interviewed and he mentioned that those participants required an extra course of English focused on their major.

Based on this information, I realized that the participants were not satisfied with the English they acquired in their English courses at the technological university because they could not accomplish their professional goal. Their necessities had to be oriented to their professional field; consequently, they needed to acquire English language for their own purposes. This led me to start thinking about a proposal on how to develop the students' written and oral genres in order to link the English courses with the specific area of study.

1.4 Research setting

For this study, data was collected from different participants students, alumni, professors and employers. The junior students and alumni were from a technological university located in central Mexico. The university is considered relatively new because it initiated in 2002. The general population is around 1600 students who major in Engineering and Accountancy. This study focused only on the Computer Science Engineering program because of the necessity of English proficiency in their profile. The professors were computer science engineers who teach content subjects at the Technological university in the region. The employers were engineers in charge of the computer science department at different companies from the region.

Since this project seeks to identify the written and oral genres used by participants in different contexts, the research method was focused on ethnographic data collection strategies and content analysis.

The data collected consisted of first a focus group with the junior students in order to identify what they use the English language for in their academic lives. This included finding out what they need to read and write in English for their content courses. In order to support this information, interviews were done to the content subject teachers to identify

the genres they promote in English during their content classes. After that, data was collected through interviews done to the alumni. This data was useful to know the genres they required to perform different tasks at their workplaces. It was necessary to identify what they need to read, write and speak in a foreign language. Finally, the employers from some companies were interviewed to know what they required from their computer science engineers to perform with the use of English.

1.5 Aims

This study set out to identify the genres used by the computer science engineers while they are majoring in the field as well as when they are professionals, and the genres required by the employers. Thus the study aimed:

- to identify the written and oral genres used by the students in their academic context.
- to identify the written and oral genres used by the alumni in their professional field.
- to identify the written and oral genres in English that employers report computer science engineers require for activities at their workplaces.

1.6 Research questions

RQ1: What are the English written and oral genres Computer Science students in this field need to acquire to develop professionally?

RQ1.1 What do the current students report they need to use English in this academic setting?

RQ1.2 What English written and oral genres do professors report students need in this academic setting?

RQ2: What are Computer Science alumni's and employers' perceptions regarding the English written and oral genres professionals need to acquire to develop professionally in the field at the workplace setting?

1.7 Chapter summary

This chapter presented an overview of this study and the relevant information that supports it. Chapter two will present the literature review and the theoretical background of this research. Chapter three will describe the methodology and the context of this research. Chapter four will present the analysis and interpretation of the results of this study. Finally, chapter five will describe the conclusions of this research.

CHAPTER TWO: LITERATURE REVIEW

- 2.0 Introduction
- 2.1 Learning a foreign language through socialization
- 2.2 Literacy
 - 2.2.1 Literacy practices at University and workplace.
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 - 2.5.3 Groups of genres
- 2.6 Research on ESP for Computer Science Engineering
- 2.7 Chapter summary

2.0 Introduction

This chapter reviews literature to understand the use of English in Mexican higher technological education. It highlights professional socialization as pathways to learn English in this context. In addition to that, the concepts associated with literacy, literacy practices and discourse communities are described. The concept of English for Specific Purposes is presented along with its history and development. Genres are presented in order to provide an idea of what people related to the Computer Science Engineering field need to be able to write, read, and speak in the academic and professional contexts where they perform some of their activities. Finally, research on Computer Science Engineering is presented.

2.1 Learning a foreign language through socialization

Learning a foreign language is a necessity that has increased significantly during the last decades in academic and professional settings. Until 2009, Mexican public education offered English mandatory courses from secondary school to university. However, international and national educational policies led to pilot English classes in public kindergarten and primary schools in 2010 NEPBE National English Program for Basic Education (*Programa Nacional de Inglés en la Educación Básica*). This implementation will consequently have an impact on the English teaching in higher education.

At present, there are different methodologies that are used for teaching and learning English as foreign language in higher education in Mexico. These methodologies will have to be adapted to learners' new necessities. An aspect that is necessary to take into account is what the learners need the English language for. Focusing on the learners who are studying a major in Computer Science Engineering the methodology needs to be focused on English for Specific Purposes (ESP) in the Computer Science community.

In a previous internal study carried out at the researched University in 2013, alumni from Computer Science Engineering stated they needed English to read manuals, updated articles and attend congresses, presentations, conferences and meetings. Professionals through socialization and participation in their professional communities acquire “knowledge, orientations and practices” that are applied appropriately in their professional lives (Garrett & Baquedano-López, 2002).

The notion of language socialization has two major areas of socialization: “*socialization through the use of language*” and “*socialization to use the language*” (Schieffelin & Ochs, 1986, p.163). On one hand, language can be used as a means for establishing socialization. Learners use English for communication during their English

courses or employees use it to communicate in their workplaces. On the other hand, people socialize in order to use the language that they are learning. In this case people start establishing relationships either at school or at work and later they communicate with those people using the English.

As mentioned above language is social as presented in the theory of language in context presented in the chart below.

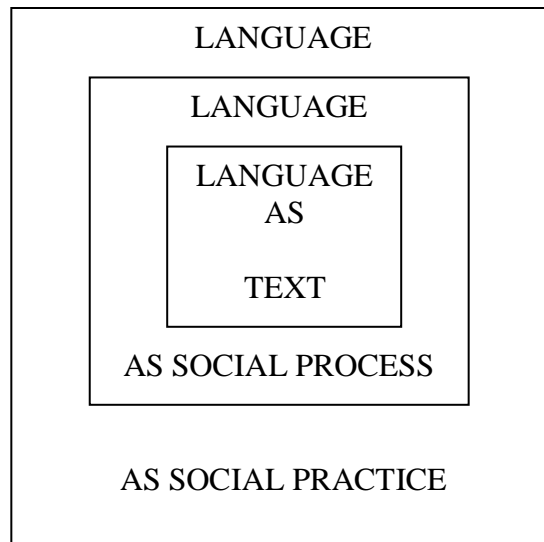


Figure 1. A model of language in social context (Baynham, 1995)

This theory of language focuses on three major components which are joined one within the other. The third layer is “language as social practice”, in this layer the aspects of ideologies, discourses and different contexts are incorporated. The second layer “language as social process” incorporates the way in which the language is connected with the contexts of situation and the concept of genre plays a very significant role. It is important to highlight that social practices occur in the social processes either in spoken or written mode. When teaching the use of the language for the social contexts it is necessary to identify the genres used by members of the professional community depending on their

necessities for communication. The first layer, the core of the model is “language as text” in which the most relevant are the grammatical and phonological systems of the language.

The examples clearly show that human beings use language for different social experiences throughout their lives. These social experiences can be lived either in the classroom or outside of it. These practices are part of the literacy of a person. Therefore, it is necessary to present information related to literacy.

2.2 Literacy

Literacy has been associated with school for many years. It has been connected to what learners develop in reading and writing during their formal education. However, this concept goes beyond that, it also includes the literacy activities that are performed and used in different literacy sites such as homes, communities and workplaces. (Hull & Schultz, 2002). Literacy takes place everywhere and at every moment in the different practices performed by all the people. Because people live with literacy all the time it is important to take into account different perceptions of this concept. The Literacy Development Council of Newfoundland and Labrador states:

Literacy not only involves competency in reading and writing, but goes beyond this to include the critical and effective use of these in peoples' lives, and the use of language (oral and written) for all purposes.

As can be observed in the definition, literacy involves the use of reading and writing in everyday lives as well as the reflection of the use of those language skills. According to the National Institute for Literacy

The Workforce Investment Act of 1998 defines literacy as ‘an individual's ability to read, write, speak in English, compute and solve problems’ at levels of proficiency necessary to function on the job, in the family of the individual and in society.

This definition involves not only reading and writing but also speaking and being competent with computers and solving problems. It also involves the use of the language in different contexts.

Literacy is not only focused on analyzing reading and writing but also on the way in which these skills are used in different disciplines (Barton, 2007). A person is considered literate when the person is competent in developing the reading and writing skills as well as when they show knowledge regarding those skills. A person can be highly literate when reading a book at school; however, the same person can be considered illiterate when reading a manual at work.

For some researchers such as Barton, Hamilton and Ivanič (2000) the overall concept of ‘literacy practices’ and the associated field of study help to provide a conceptualization of reading and writing in the various locations where they are carried out. Literacy practices involve the cultural ways that are involved when people use the written language through the different activities performed in their lives. Based on this concept, it is possible to say that it is not the same to read a text from the textbook than to read a manual at work. It is not the same practice to create a role play in the classroom than to have a phone call with a customer at work. The language is not the same when learners write grammatical exercises than when they have to write a report at work. It is not similar to send an e-mail with personal information for a class than for a job.

Literacy as practice involves looking at literacy as “concrete human activity”. Focusing on this idea it is necessary not only to pay attention on “what people do with literacy” but also “what they make of what they do” (Baynham, 1995). The practice involves doing and knowing. It is necessary that people know how to write and speak in a specific context in order to be able to put their knowledge into practice. This can be reflected when they need to write a letter for their friends, an essay for school, a report for their bosses or to call their friends, principals and bosses. All these practices take place in different contexts such as the house, the street, the classroom, the school, the office, the company among others.

The use of the spoken and written language takes part in different social practices that people live during their everyday lives. This occurs because human beings are social and they have the necessity to interact with certain groups of people either using the spoken or written language.

There are many different activities where literacy takes place for this reason “literacy is seen as a social practice” (Barton, Hamilton & Ivanič , 2000, p.1). The activities or events occur in a situated time and place. These situated actions belong to a specific social practice. Most of the times in the development of those activities there is a text or several texts and a talk about those ones. It is important to see that there is a connection between texts and practices.

Talking about literacy as a situated social practice involves researching on how literacy is used in different contexts such as home, school, and work. Literacy practices are developed in different ways when the person performs them at home, at school or at workplace. For example, literacy practices are very different when a person reads a letter from a friend at home, when the person reads a book at school and when the person reads a

manual or articles at work. The texts are very different; consequently, the social practice is different because it occurs in different places, at different times and for different purposes.

2.2.1 Literacy practices at University and workplace

Employees at any specific field need a certain academic degree to start working. At this point of their lives they have already acquired several tools to develop their literacy practices. They are able to produce certain kinds of texts as well as maintain conversations related to certain topics because they have acquired those abilities in the classroom. However, those skills are often not very related to what they will need at their workplaces.

There is a connection between what is happening inside the classroom and outside the classroom when the employees are involved in their real context which is their workplaces (Baynham, 1995). Thus, it is necessary for higher education language learners to acquire language through their literacy practices while they are at school so that they can apply them in their workplaces. The objective is that the employees make the connection of what they learnt in their classes with what they have to do in their workplaces.

Literacy practices are different depending on the context. It is not the same to write an assignment at school than to write a report at work. The language used in both writings is different because of the context and the particular community that uses it. The context plays an important role because it establishes a specific discourse community. Consequently, the next section will present information related to discourse communities.

2.3 Discourse Communities

Human beings cannot live isolated and they tend to live in groups and build communities. These kinds of communities are formed by people who share similar ideas,

characteristics, interests and needs. In fact, all the people who are part of a society belong to a community. The same occurs with the language, people who use the same kind of language with the same purpose are part of a community. Consequently, it is necessary to define the concept of “discourse communities”.

2.3.1 Definition of Discourse Communities

English language is used by specific groups of people for different purposes. Swales (1990, p.58) defines the discourse community as “the parent of genre”. He attributes the concept of ‘discourse community’ quoting Herzberg (1986):

Use of the term “discourse community” testifies to the increasingly common assumption that discourse operates within conventions defined by communities, academic disciplines or social groups. The pedagogies associated with writing across the curriculum and academic English now use the notion of “discourse community” to signify a cluster of ideas: that language use in a group is a form of social behavior, that discourse is a means of maintaining and extending the group’s knowledge and of initiating new members into the group, and that discourse is epistemic or constitutive of the group’s knowledge. (Herzberg, 1986, p.1, as cited in Swales, 1990, p.21).

A discourse community establishes the kind of language they use to communicate with people from the same community and to the ones who begin to be part of this group. It is necessary to take into consideration that the discourse communities have similar needs and interests and people who belong to a specific discourse community talk the same language regarding a specific topic of their field. A discourse community must possess specific characteristics that are presented in the following section.

2.3.2 Characteristics of the Discourse Communities

In order that a group of people can be considered a discourse community, it needs to have certain characteristics. According to Swales (1990), discourse communities fulfill six principal criteria: “common goals, participatory mechanisms, information exchanges, community specific genres, a highly specialized terminology and a high general level of expertise”. (p.29)

The first characteristic specifies “A discourse community has a broadly agreed set of common public goals”. The public goals are established by the people who use the language for communication regarding to a particular field. It is significant to take into consideration that a specific group use the most appropriate language to transmit their ideas and messages. The specific terms they use are particular of the discourse community and can be managed and understood only by members who are part of this community.

The second one establishes “A discourse community has mechanisms of intercommunication among its members”. In a discourse community, the members who belong to it establish the most common ways for communication based on their needs. In different fields the members who have more experience on the topic influence the new ones to be part of the community and to belong to it. As an example, when a computer science engineer gets his or her first job and starts working in the computer science department with more experienced engineers, he or she starts adopting language for communication regarding to the topics of the field and to perform the different activities at work.

The third characteristic considers “A discourse community uses its participatory mechanisms primarily to provide information and feedback”. This characteristic can be clearly seen in academic and professional settings where the participants need to share information to accomplish their goals as a group or as a team. At school professors and students need to transmit the appropriate message in order to get the activities done. The

same occurs at the companies where the workers with different positions need to manage the same information to perform their work in the appropriate way.

The fourth one states, “A discourse community utilizes and hence possesses one or more genres in the communicative furtherance of its aims”. The discourse community establishes the most common genres they need to use to communicate in oral and written forms. The discourse community can use genres from other communities or they can establish their own ones. It is important to highlight that a discourse community can be known and identified due to the specific genres they use to perform their activities.

The fifth characteristic considers “in addition to owning genres, a discourse community has acquired some specific lexis”. The community uses specific genres; however, it also uses specific kind of vocabulary and acronyms that are commonly used in the field. Members who belong to a specific discourse community need to be familiar with the lexis used in the field and to deal with it.

The last one indicates “A discourse community has a threshold level of members with a suitable degree of relevant content and discorsal expertise”. In a community there are always members who are novice and others who are experts. The experts most of the times are responsible to share their ideas and experience with the novice to create a better community in the fields. This characteristic is clearly seen in the field of computer science engineering where the expert engineers share information with the novice engineers or students to accomplish the goals of the community.

The members who belong to a discourse community share the same interests and needs; as well as, the same language to communicate. Therefore, it is necessary for the participants who belong to a specific community to get involved in courses focused on English for Specific Purposes due to the necessity of the English language to perform

specific activities at school or at their workplaces. Consequently, the topic of English for Specific Purposes will be presented in the following lines.

2.4 English for Specific Purposes

Focusing on the field of language teaching at the beginning it was only necessary to emphasize on General English because all the courses were designed on teaching English at different levels of school. However, through the years the use of English has been involved in many different areas due to the globalization of the world. Different disciplines have presented the necessity to create courses focused on specific English to satisfy the learners' necessities to accomplish their goals and to be able to perform specific tasks with the use of the language. The field of English for Specific Purposes (ESP) has developed rapidly in the last fifty years; for this reason, it is important to define English for Specific Purposes and to identify its characteristics.

2.4.1 Definition and characteristics

ESP has been defined as “an approach to language learning, which is based on learner need” (Hutchinson & Waters, 1987, p. 19). It is important to highlight that the main purpose of ESP is to identify what the learners' need to do with the language in order to create specific courses that develop the learners' skills to satisfy their needs.

ESP is a pedagogical movement in applied linguistics which focuses on students who are adults and have specific language learning goals related to their current or future academic, professional or vocational lives and contexts (Dudley-Evans & St John, 1998, p. 122). ESP practitioners conduct research into the students' language needs, their wants, and

their academic and professional goals (*needs analysis*) as well as into the discourses and cultures where the students will be working or studying (*target situation analysis*).

English for academic purposes (EAP) has been considered a branch of ESP (Hutchinson & Waters, 1987; Jordan, 1997; Charles & Pecorari, 2016). The teaching of EAP can mainly be found in higher education institutions whether they belong to English-speaking context or not (Jordan, 1997). English for Academic Purposes has been divided in two main sections; English for general academic purposes (EGAP) and English for specific academic purposes (ESAP). On one hand, EGAP courses mainly focused on the main skills or general study skills; for example, critical thinking. On the other hand, ESAP courses are focused on subject-specific skills and language. These courses focus on the specific language that is required in a specific discipline like economics or mechanical engineering.

In the work of Dudley-Evans and St. John (1998 pp. 4–5), they recognized three main characteristics of ESP which are identified in the following lines:

- 1) ESP is designed to meet specific needs of the learner. The courses focused on ESP need to consider the learners' needs regarding the language. It is important to identify their needs in order to design the appropriate course to satisfy their necessities regarding the language.
- 2) ESP makes use of the underlying methodology and activities of the disciplines it serves. In ESP it is relevant to take into account the discipline and the necessities that have to be covered with the design of a specific course. The learner needs to be prepared to deal with the specific activities required in the discipline.
- 3) ESP is centered on the language (grammar, lexis, register), skills, discourse and genres appropriate to these activities. English for Specific Purposes is very complete

because it focuses on everything related to the process of language learning to satisfy specific learners' needs.

2.4.2 History and development of ESP

The history of ESP can be divided in at least five stages (Hutchinson & Waters, 1987). It traced back to 1960's and 70's, in these years the main purpose was to register analysis in order to identify the grammatical and lexical features used in a specific discipline for example Electrical Engineering and to create teaching materials focused on the identified linguistic features that need to be acquired by the learners.

The second stage moved beyond the sentence level as ESP practitioners focused on discourse analysis to analyze and examine different textual patterns used in specific disciplines. At this stage for example they were interested in analyzing how a biology text may be organized in terms of description, definition, and classification.

Regarding the third stage, they started to focus on the identification of learners' reasons for learning. In this stage, ESP practitioners were focused on the analysis of the target situation which means to identify the learners' needs and wants to accomplish their language learning purposes in the best way.

By the year 1980 the purpose of ESP expanded a little bit more, practitioners focused on the language that ESP learners needed for a particular target situation and in the thinking processes for the language use. As a result, the fourth stage focused on the language skills and strategies. It contributed to the creation of materials to help the learners to develop the reading skills; for example, guessing the meaning of unknown vocabulary from context or looking at how meaning is produced in spoken discourse.

The fifth stage is focused on a learning centered approach. It deals with different conceptualizations of the use of the language. It explores the learners' processes of language learning in order to contribute with the appropriate language teaching strategies. As explained previously, the ESP has evolved through the years in different stages. In each one of those stages, specific functions and activities were performed in order to contribute to the development of the field in English for Specific Purposes. Furthermore, it is using more corpus analysis to study the language used in both written and spoken mode in each discourse community in this case of computer science engineering.

2.4.3 Importance of ESP

ESP focuses on the students' communicative needs and practices of specific professional or occupational groups (Hyland, 2007). The most important aspect of ESP is to know what the learners need to do with English. Learners' purposes are different they may have an educational need or a professional need (Dudley-Evans, 1997). For example, a student of computer science engineering whose mother tongue is Spanish but is studying his major and needs English to read books, articles and manuals and for writing reports, summaries and essays for the classes. In this case English is used for educational needs. However, a novice computer science engineer who is starting at the workplace uses English to read manuals at work, to establish a conversation with the bosses, employees or clients, to make phone calls to the distributors, to send e-mails to other people around the world, and to write reports. In these different situations English is used for professional needs.

In general, the main function of ESP is "to help language learners cope with the features of language or to develop the competencies needed to function in a discipline, profession or workplace." (Basturkmen, 2008, p.6) -ESP focuses on developing specific

competences that language learners need to be qualified and competent in developing certain tasks that require the language in their everyday lives as well as the academic and workplace contexts. Nowadays, it is not only important that a person communicates in everyday situations but also to manage the language in aspects that have to be performed at school and most important the use of the language at their workplaces.

After reviewing the literature, it is relevant to highlight the importance of learning a foreign language for different purposes: personal, academic, and/or professional. These purposes depend on the learners' interests and necessities regarding their personal, academic, and professional fields. -Depending on the learners' purposes, they start establishing certain communities of practice.

Interest in English for specific purposes ESP is increasing, because of the need for professionals to communicate in English. However, it is necessary to highlight that it is not enough for professionals to have language tools for the everyday lives or academic purposes, but it is also necessary to acquire certain language tools that help them face their reality at their place of work. The lack of those skills and the adequate language frustrates students when faced with the reading of a manual, reading the instructions to assemble a computer or any other machine, making a phone call, making a presentation, write a report or sending an e-mail. As a result, they fail in the connection between their major and English. According to Orr (2002, p.1) "Specific-purpose English includes not only knowledge of a specific part of the English language but also competency in the skills required to use this language, as well as sufficient understanding of the contexts within which it is situated."

Until now a significant amount of research has been done related to English for technology, business, tourism, medicine and law, but in this national context researchers

have generally not focused their attention on English for Computer Sciences Engineering. Regarding the context and language, ESP practitioners have adopted *genre* as a central concept to ESP research (Paltridge, 2001; Swales, 1990). Working with computers requires a certain level of English proficiency; therefore, engineers have to be able to use specific genres required in their specific areas of study and work. Consequently, it is important to highlight the topic of genres.

2.5 Genres

The different practices illustrated above lived by the learners and workers are part of their literacy genres. Those genres involve the practices encountered in the classroom, work and social contexts. As a result, it is necessary to define the concept of genre and the different types of genres in order to organize the main practices found in the literature.

2.5.1 Definitions of Genre

Genre involves different literacy elements with similar characteristics. It refers to the different events that share similar purposes. According to Devitt (2004, p.1) “Genre pervades human lives. As people go about their business, interacting with others and trying to get along in the world, they use genres to ease their way, to meet expectations, to save time.”

The term “genre” does not have only one definition; therefore, several perceptions of this concept are presented regarding the context where it is applied.

In ESP genre work, the term genre refers to a class of communicative events, such as, for example, a seminar presentation, a university lecture, or an academic essay. In “systemic” genre work, a genre is more often referred to as a kind of text, such as a description, procedure, or exposition. In new

rhetoric work, genres are often described as events or social actions that help people interpret and create particular texts. (Paltridge, 2001, p.2)

Genres are established based on the texts and talks that are used in different contexts and times. This idea is supported by Biber (1989) who says that “the term genre characterized texts on the basis of external criteria, such as a text that is written or spoken by a particular person, for a particular audience, in a particular context, for a particular purpose, and viewed by the discourse community as being an example of the particular genre.” (taken from Johns, 2002, p.74)

Kress states that “genre is a useful term for understanding what texts do and how they do it” (cited in Cope & Kalantzis, 1993, p.22). In this respect, the author works for a concept of genre in which the grammar makes meanings for social and cultural significance. The grammar needs to focus on function in texts; consequently, social categories need to be established for explaining the texts.

The different texts create a “social fact” for the readers. Those social facts are meaningful social actions that are accomplished through the language or “speech acts” which are carried out in textual forms or “genres”. These genres are connected to other texts and genres that occur in related circumstances. The genres are organized in groups based on the similar characteristics, and these “genre systems” are part of the “systems of human activity” (Bazerman, cited in Bazerman and Prior, 2008, p.311).

The term “genre” is also used to refer to different types of texts that represent several types of social contexts (Martin & Rose, 2003, p.7). For a specific social context there are certain types of text used for establishing the relations among people. It is important to consider that an engineer is going to read and write certain kinds of texts

different from a doctor or an accountant. These texts contain information related to the field of study and professionals manage to read and write the texts that correspond to their areas.

For Martin & Rose (2003, p.7) “a genre is a staged, goal-oriented social process.” A genre is “social” because people participate with other people in the different genres. It is “goal-oriented” because people use genres to get different things done. Finally, it is “staged” because people need to go through different steps in order to reach their goals.

Swales (1990, p. 467) considers “genres are types of texts that are recognizable to readers and writers, and that meet the needs of the rhetorical situations in which they function.” All the written documents have a specific format that is recognized by the people when they use it for a specific context and in a particular situation. For example, students who are majoring a specific career recognize the format of journals, articles, reports and texts from books. They also know the elements they need to use in order to write a summary, an essay or a report. The same occurs with oral performances, students know how to develop an oral presentation, an opinion of a specific topic, or any other activity they are required to do in the classes.

“Genres are ways in which people ‘get things done’ through their use of spoken and written discourse” (- Paltridge, 2006, p.84) People use the spoken or written discourse for different purposes. The text is the production of a written genre while a talk belongs to the oral genre. After having an idea of what genre is, it is necessary to present the different types of genres that have been established through different research.

2.5.2 Types of genres

The different texts, documents and speeches are classified into different types of genre. It is necessary to identify the different types of genres in order to make a clear

classification of the texts, documents and speeches that belong to professionals in different contexts. In the following section the oral and written genres, the digital genres and the workplace genres are going to be presented.

2.5.2.1 Written and oral genres

The written practices presented in the classroom, work and other social contexts belong to written genres. The written genres are composed by the different texts written by different people. It is important to specify that identifying the most relevant properties of a text is a hard task. However, this process is necessary to find different sets of properties that distinguish one text from other texts.

Miller and Weinert (1998, p.17) consider that- “within the genre of written language there are sub-genres such as literature (including sub-sub-genres such as novel, play, poetry, autobiography, and diary), business correspondence, company reports, academic books.” The written genres are the ones that use the written discourse for their creation.

The oral practices presented in the classroom, workplace and other social contexts belong to the oral genres. The creation of a unique classification of elements that belong to the oral genres is impossible because these elements vary according to the different studies done by the authors.

There is a classification established by Miller and Weinert (1998, p.17) “within the broad genre of spoken language many different sub-genres can be recognized differing in formality, purpose and setting: lectures, sermons, legal speeches, news broadcasts, Radio 3 talks, story-telling.” As can be seen the oral genres are the ones that use the spoken discourse.

Based on a study in ESP publication, *English for Specific Purposes: An International Journal* established in 1981, most of the research has to deal with the written discourse used for the students' academic success focused on the sciences (Hewings, 2001).

ESP researchers have increasingly focused on the term "genre" for their discourse analyses, to establish the idea that written and spoken discourses should be viewed as situated: purposeful, contextualized, communicative actions taken by a speaker or writer (Swales, 1990). According to his research, Swales establishes that there are purposeful academic genres; such as, research articles, proposals, abstracts, lab reports. There are also professional genres; for example, legal briefs, business letters, resumes. Finally, there are also vocational genres like application forms, accident reports, work schedules.

2.5.2.2 Workplace genres

Spinuzzi (2004) has highlighted the way many workplace genres are designed primarily to mediate activity. At the workplaces, there are certain genres that need to be modified to accomplish the activities that are required to be done with the use of the language. Based on his analysis of genres, Spinuzzi (2004) concludes:

workers continually draw on existing genres to develop local ad hoc solutions to recurrent problems in their particular workplace. They take official genres that were designed for broad situations and modify them with unofficial genres to produce solutions tailor-made for their own local situations. In doing so, they build genre ecologies that collectively mediate their complex activities. (p. 222)

After seen some examples of written, oral, and workplace genres, it is important to highlight that each one of the genres do not come along or isolated, they belong to a group or a genre chain that will be presented in the next section.

2.5.3 Groups of genres (genre chain)

At the beginning of the research on genres the analysts used to study them as isolated phenomena; however, through the time they have seen that several genres can be involved and create systems of genres. It is necessary to highlight that these systems of genres have been described by different authors with specific terms. For instance; Genres have been described in terms of Chains (Swales 2004, Fairclough 2004), Colonies (Bathia 2002), Sets and systems (Bazerman 1994, 2004a, Devitt 1991, 2004) and Ecologies (Spinuzzi 2004). The genres used by specific groups of people for a determined discipline are relevant to contribute on the design of specific materials for the language teaching learning process. Research needs to be done to identify the functions, discourse structures, grammar, vocabulary, and visual features, to be able to develop curricula and pedagogies for a particular group of students and a specified context (Paltridge, 2001). Researchers interested in different disciplines need to investigate the specific needs of the learners in order to contribute with useful materials and courses focused on English for Specific Purposes.

2.6 Research on ESP for Computer Science Engineering

One of the objectives of this research was to explore the written and oral genres that computer science engineers use in their academic and professional fields. Therefore, it is of great importance to see the research done on this discipline.

Little research has been done regarding to the field of ESP and Computer science engineering and mainly it has occurred in the academic settings. There was a study realized in Pakistan in June 2018 to identify the students' needs regarding English language in the Computer Science Department. Since the language used for technology is English, this study aimed to design English for Academic Purposes (EAP) course for University students enrolled in the Computer Science Department. The data obtained in the research demonstrated that the four language skills; listening, speaking, reading and writing, are frequently used to perform the academic activities. It was also found that students presented more difficulties with the writing and speaking skills. Consequently, these two skills should be more developed with activities in the syllabus.

Another research was done in August 2018 to create a Module of ESP for students of the Computer Science Department of Muhammadiyah University of Metro and to see the results of applying this module with the students. It was satisfactory due to the participants accomplished their goals while acquiring specific vocabulary to perform their academic activities. This vocabulary will be also useful to deal with more specialized texts focused on the major at University.

As seen above research has been done regarding to the field of ESP and computer science engineering in the academic context; however, no research has been found regarding the workplaces.

2.7 Chapter summary

After reviewing the literature, it is important to highlight that human beings use the language for different social practices through their lives in different contexts. Literacy takes place everywhere and at every moment because people need to use the language for

writing, reading and communicating in specific contexts. At school, students acquire certain tools to perform their literacy practices; however, these ones might change when they face the literacy practices required at the workplaces. The literacy practices are performed by specific groups of people with similar needs and interests which are called discourse communities. In these communities, participants share the same topics focused on specialized language. Therefore, English for Specific Purposes was analyzed as well as its characteristics. Finally, the concept of genre was presented and the written, oral and workplace genres were analyzed to have a complete view of ESP in the Computer Science Engineering field.

CHAPTER THREE: STUDY METHODOLOGY

- 3.0 Introduction
- 3.1 The context of the research
- 3.2 Participants
- 3.3 Data collection instruments
- 3.4 Data collection procedure
- 3.5 Data analysis
- 3.6 Chapter summary

3.0 Introduction

The purpose of this study was to identify the written and oral genres in English used by computer science engineers as undergraduate students majoring in the field, as well as professionals working at their workplaces. It is also necessary to identify the genres required by the employers who hire computer science engineers.

This chapter presents first the context and different participants for this study. The second section explains the research methodology, the data collection instruments and the rationale for selecting those instruments. The third presents the data collection procedures. Finally, the data analysis procedures used to carry out this research are also described.

3.1 The context of the research

The research was carried out in two contexts: a public technological university located in the central part of Mexico and two companies in the region that hire computer science engineers from this and other universities.

The public technological university offers seven different majors which are Computer Science Engineering, Electromechanics Engineering, Industrial Engineering, Environmental Engineering, Accounting, Business Management Engineering and Information Technology and Communication Engineering. Students in these seven majors

have to take six levels of English which means six semesters or three years. English courses are not included in the curriculum; however, the levels of English are a requirement for the students to do their professional residences and graduate. The university implemented the Model of Competencies and the curriculum is based on this model. This study focused only in one major, Computer Science Engineering, because the professional profile requires professionals who use English. Apart from this, professionals are living in a globalized world where English is a requirement and thus, requires computer science engineers who perform different activities in English.

This study was also carried out in two companies that hire alumni from this university and other schools. These companies are also located in the central part of Mexico. They are companies that require computer science engineers who perform different activities in the Computers department and in these companies the use of English is necessary to perform several work activities.

3.2 Participants

Four different groups of participants were involved in this study. The first group of participants was 12 students majoring in Computer Science Engineering at the research site university. The second group of participants was eight professors who teach different content subjects at the computer science engineering program in the research site university. The third group of participants was formed by alumni of the same computer science major who work at several companies and have different years of experience and positions. The last group is composed by two potential employers from the companies who hire the professionals and workers of the field with certain experience at the working sites. All these participants contributed with data for the development of this research.

First, the participants who were current students at university were chosen at random from the eighth semester of the Computer Science Engineering. This group of participants included 12 current students (5 females and 7 males) whose age ranged between 21 to 25 years old. I decided to choose participants from this semester because they have already finished with their English courses and had an idea of their needs in English in their professional field and in their content subjects. The participants were willing to participate because they wanted to express their perceptions regarding the use of English and they wanted to contribute to the study.

Second, the professors who belonged to the Computer Science department at the university and teach content subjects related to computer science engineering. This group was formed by five males and three females who were teaching the bachelor's degree in computer sciences. Five of the professors have a master's degree related to computing sciences. Four of these participants already had the experience of working at companies related to their field. Third, the alumni were selected from the previous generations taking into account that they were working at different companies and they had different positions. It is important to highlight that I got a list of 102 alumni of the computer science engineering and sent an e-mail invitation to 90 alumni; however, only 23 answered my e-mail. From those 23 alumni only 18 accepted to have the interview. They were 18 alumni (five females and thirteen males) whose age ranges between 24 to 32 years old. These professionals were currently working and they were freshmen and juniors at their workplaces. Only the participants who accepted to cooperate in the study were contacted because I had to be in constant contact with them through e-mail and personally. These participants accepted to participate in this study because they were interested in the topic and they thought they could contribute with some useful information for this study.

Fourth, the two companies that participated in the study were selected taking into account that those companies hired professionals from the university. I selected five companies near the region and the ones who hired alumni from the site research university; however, only two companies accepted to participate in the study. These companies hire professionals in the context where the study took place. The characteristic of these companies is that they use English for the development of certain activities. It was difficult to get the companies to participate in the study because they have confidential information and it was hard to access to them.

3.3 Research Methodology

Creswell (2012) explains that research designs are specific procedures that cover three main aspects: how data are to be collected, analyzed, and reported. Taking into consideration these claims and the objectives of this study, a case study design will be used to explore how computer science engineers and students use different written and oral genres in English for their academic and professional lives. Focus groups, questionnaires, and interviews were used to collect the data. All these instruments were designed in Spanish in order to obtain reliable data from the participants. A focus group was used for the current students and face to face interviews for the teachers, alumni, and employers, and e-mail interviews through questionnaires for those who I could not contact face to face.

As mentioned previously, the purpose of the focus group was to identify the different written and oral genres that the students used in their academic context and the way in which these elements can be useful for their future professional development at their workplaces.

Then, I applied interviews to the professors of the computer science field at university in order to gather data related to the written and oral genres promoted during their content classes. Since I am a professor at the same university where they are, I was able to keep in contact with them to obtain necessary information for the research.

Later, I applied a semi-structured interview to the eighteen alumni in order to obtain data regarding the written and oral genres they use in English most commonly in the workplaces. After the interview, I decided to follow up with the e-mail interviews in order to keep in touch with the alumni and continue gathering extra data when required.

After this, I worked with the companies. In this case, I decided to apply face-to-face interviews because of the importance of the research and the reliability of the data. I had to make appointments for the interviews which focused on exploring the written and oral genres that the employees need to be able to manage in English. I established contact with the people who answered the interview in order to continue gathering data with further details that were needed for the study.

3.4 Data collection procedure

Several steps were followed to obtain information related to this study. First of all, it was necessary to design a chronogram of the different activities that were going to be performed in order to collect the data.

The second step was to formulate the questions for the focus group. The questions for the focus group were piloted with five students who were chosen at random. After identifying some weaknesses of the instrument, the necessary changes were made, and it was possible to carry out the focus group. The participants were selected at random; they were asked to participate, and they accepted.

The third step was to formulate the appropriate questions for the professors of computer science engineering at university in order to obtain the written and oral genres they promote in their classes with the use of English. After piloting the interview questions, the data were collect using face-to-face interviews with professors. All the professors from the computer science department at university were invited to participate; however, only 8 out of 12 accepted to be part of this study.

The fourth step was to design the questionnaire for the interviews; it was piloted and sent to different alumni who were currently working at different companies. When I collected these data, I sent e-mails to 90 alumni from a list of 120 alumni. After receiving response from 23 alumni, I kept in touch with them through e-mail. Each one of them was asked for an appointment in order to carry out the face-to-face interview. The appointments were scheduled based on the participants' availability. Unfortunately, the number of alumni turned into 18 who were the ones who accepted the interview.

The fifth step was to identify the companies that hire computer science engineers. In the region, there are several companies. After identifying the potential companies, the questionnaire was designed, piloted and then, the companies were invited to participate. I was really careful in this stage of the study development because I considered this as the most important part for my study. I made appointments with the people who were in charge of providing information regarding the companies. These appointments were scheduled in different days and at different hours.

3.5 Data Analysis Procedure

This study uses a summative content analysis starts identifying and quantifying certain words or content in text to understand the contextual use of the words or content

(Hsieh & Shannon, 2005). This analysis goes beyond mere word counts to include latent content analysis. An analysis involving the categorization and quantification of genres used in the academic and workplace contexts was done. In order to analyze the participants' perceptions, a content analysis was applied. It is important to highlight that all the data obtained through the instruments used for the research was in Spanish; as a result, I translated into English all the information presented in the excerpts.

3.4 Chapter conclusion

This chapter presented the description of the locations and the participants who were involved in the study. It also provided information related to the instruments used for the study as well as the processes that were carried out to gather the data and the way in which this information was analyzed. In the following chapter, I present the results obtained from the data analysis.

CHAPTER FOUR: RESULTS

- 4.0 Introduction
- 4.1 Genres used in Computer Science Engineers academic setting
 - 4.1.1 Students perceptions
 - 4.1.1.1 Written genres
 - 4.1.1.2 Oral genres
 - 4.1.2 Professors of the major perceptions
 - 4.1.2.1 Written genres
 - 4.1.2.2 Oral genres
 - 4.1.2.3 Sets of genres
- 4.2 Genres used in the workplaces for Computer Science Engineers
 - 4.2.1 Alumni perceptions
 - 4.2.1.1 Freshmen alumni
 - 4.2.1.1.1 Written genres
 - 4.2.1.1.2 Oral genres
 - 4.2.1.2 Junior alumni
 - 4.2.1.2.1 Written genres
 - 4.2.1.2.2 Oral genres
 - 4.2.2 Employers requirements
 - 4.2.2.1 Written genres
 - 4.2.2.2 Oral genres
- 4.3 Chapter summary

4.0 Introduction

The purpose of this study was to identify the written and oral genres used by computer science engineering students while they are majoring in the field, as well as when they are professionals working at their workplaces. It is also necessary to identify the genres promoted by professors in the academic setting, as well as the genres required by the employers who hire computer science engineers. In this chapter, the findings will be presented. First, the genres used by students who are majoring in the career will be described, as well as the genres promoted by the professors of the major. Second, the genres used by the employees and the ones required by the employers in the workplaces will be presented.

4.1 Genres used in Computer Science Engineers academic settings

The use of English takes place in the academic context of students who are majoring in computer science engineering because they use the language to accomplish certain academic tasks required by their teachers (Bazerman et al., 2005). It is important to take into consideration that the acquisition of specific competencies deals with the use of English in their majors. Therefore, it is important to identify the genres performed by the students during their classes and outside of them to achieve their goals with the use of the language.

4.1.1 Students' perceptions

A focus group with 12 students was done in order to obtain data for this study. Students who participated said that they did not need English for all their subjects because not all the teachers asked for assignments that required this language. These participants provided the subjects in which they have used English to perform specific academic activities asked by the professors in their field. Those subjects are the following ones: *Numerical methods, Mathematics V, Graphing, Distributed Systems, Basis, Database, Database Workshop, Architecture of computers, Processes, Distributed Database, Fundamentals of Programming and Webs*. They used English in 12 of the 50 subjects in the Engineering program. These subjects are taught from the 4th to 8th semesters of their careers.

The participants stated that in these subjects they had to use certain genres due to the requirements of the competencies and the motivation of their content teachers to use a foreign language. At some point of their courses they had to use mainly written genres in order to accomplish the objective of the competencies and sometimes also oral genres.

4.1.1.1 Written genres

The information obtained by the participants of the focus group clearly shows the written genres used by the students who are majoring in the field of computing to perform certain activities at university.

Table 1

Written genres used in the academic context and number of participants.

ACADEMIC CONTEXT WRITTEN GENRES USED BY STUDENTS	Number of participants who used each one of the written genres in the courses
Read manuals	12 participants
Read web pages	10 participants
Read internet blogs	10 participants
Read books in English	7 participants
Read journal articles	6 participants
Read numerical methods	5 participants
Write abstracts	12 participants
Write short phrases in class	12 participants
Write commands/ instructions	12 participants
Write short messages on facebook	10 participants
Write information for consultation	10 participants

Based on this classification of written genres, there are some activities in which they had to read and others in which they had to write. Focusing on the written skill, participants need to do the following with the language:

- They need to read “**manuals**”, one of their most common activity because many programs of Computer Science have a manual in order to know how to use it or how to program it.
- They need to read “**information from Web pages**” in order to learn new concepts or to do some activities in their classes.

- They also need to read “**Internet blogs**” to know more about the experiences of other specialized engineers in computer science engineering. Four participants stated they need to read the information about Operative System Linux in the blogs.
- They need to read “**books**” in English in order to obtain updated information about topics related to their specific subjects. From the books they need to read a specific unit or part of it, and they need to make a presentation about certain topics.
- They need to read “**articles**” provided by their teachers and often these are taken from specialized journals because they need to understand a specific topic from their formative subjects such as Distributed Systems, Database, Architecture of computers, and Fundaments of Programming.
- They need to read “**numerical methods**” in English during their classes. In the subject of “Numerical Methods”, they usually got articles in English with the different methods and they needed to understand the information in order to apply the appropriate methods for the exercises.

Written genres are not only focused on what the participants need to read but also on what they need to write. Participants need to write for the following situations:

- In their last semesters of their major, they need to write an “**abstract**” for their integral projects. The participants are asked to do a research project from a specific company where they have their social service and residences. In this project, they need to write the abstract in English and the rest of the project in Spanish. The abstract of the projects provides general information of the research and a complete view of their work.

- They also need to write “**short phrases**” in their classes depending on the subjects. These phrases were sometimes provided by the teachers and sometimes students need to write them to solve an exercise. In the subject of Webs, they use phrases to establish a connection between the client and the server.
- They need to write “**commands and instructions**” in order to perform an activity on the program they use in the field mainly in the subject of Fundamentals of Programming. They also need to write commands, follow instructions and install the programs to administrate software. To write the commands and instructions correctly is particularly important to accomplish the goal and to perform the functions.
- They usually need to write “**short messages on facebook**” to publish or get information about some topics. Participants also communicate with people from other countries who also know about the topics of Programming. They can solve their doubts with people who have experience in the field (Swales, 1990).
- They need to write “**information on the browser**” on the internet to consult about different topics related to the different subjects of their major.

4.1.1.2 Oral genres

In the field of computer science engineering at the university where the study was carried out the participants in the academic setting use fewer oral genres than written genres. Oral genres are more difficult to manage by the participants due to their low English level.

Table 2

Oral genres used in the academic context and number of participants.

ACADEMIC CONTEXT ORAL GENRES USED BY STUDENTS	Number of participants who used each one of the oral genres
Tutorials	12 participants
Videos on the Internet	9 participants

The participants reported they needed to use English to understand “**tutorials**” presented by their teachers in the classes. They also said “the tutorials are a vital part of their field because many processes on how to install and run a program are explained with those tutorials”. Participants explained that “when they do not understand any topic about their subjects, they watch tutorials to understand everything clearly”. Another comment the participants stated is that “all the important information for the computer science field is in English”.

The participants agree they need to “**watch videos on the Internet**”, this activity usually occurs during some of their classes in the subject of “Distributed Systems”, when the professors present a specific topic on their field. However, they also watch videos at home when they are asked to research about a topic that is going to be discussed in classes. It is important to point out that they watch the videos in English; nevertheless, their reports or ideas about the information are written or discussed in Spanish.

4.1.2 Professors’ perceptions

Other important participants regarding the Academic setting are the professors who teach curricular subjects in the Computer Science Engineering Major. They are specialists in the subjects, and they know the competencies that the students need to develop during the different semesters of their career. These participants considered that in the computer science field the most updated and reliable information is always in English and students

need to have a good level of English in order to perform their tasks, assignments and activities.

For this study, 8 professors were interviewed to obtain data. Professors specified the subjects in which the students are required to use genres in a foreign language. According to their information provided for this study, the professors alluded to the subjects below in which English is necessary in order to reach the objective of the competencies:

Artificial intelligence, Engineering in software, Database, Programming Fundamentals, Programming focused to objects, Distributed Systems, Distributed database, Projects' Development, Mathematics IV, Simulation, Numerical Methods, Graphing, Operative Systems, Language assembler, Compilers, Theory of programming, Webs, Webs' administration, Telecommunications, Web programming and the course of CISCO.

Participants consider that students need to use English in 22 of the 50 subjects in the Engineering program. These subjects are taught from the 4th to 8th semesters of the major. English is mainly used for activities in their formative subjects.

Professors expressed the following information regarding to the subjects in which they promote the use of English.

Participant 1:

English is mainly used in the subject of Artificial Intelligence due to all the technological advances are written in this language.

Participant 3:

For distributed database most of the **bibliography** is in English. The translations of the books are generally not good because they sometimes have errors and they can distract to the reader and to lose the essence of the information.

Participant 5:

I could say all the subjects of Programming and the formative ones use English. It is due to all the new technologies, in this program there are many **articles**, different links for **Web pages**, **books** or **magazines** in English. Therefore, students can practice their reading comprehension.

As seen above, most of the participants agree that English is important for the computer science engineering field because most of the information for the topics is in English. They also consider that for all the subjects of Programming, English is necessary because the most useful material is in this language and they believe the translations into Spanish are not good enough. They consider students need to use English from basic activities like writing commands and instructions to more difficult ones reading articles from books.

4.1.2.1 Written genres

Participants consider that written genres are the ones more required during their courses because they generally ask students to read different kinds of texts, as well as instructions and algorithms, everything focused on technical concepts. They also require the students to write instructions, codes and reports in several subjects of their major.

Table 3

Written genres promoted by professors in the academic context and number of participants.

ACADEMIC CONTEXT WRITTEN GENRES PROMOTED BY PROFESSORS	Number of participants who promote the use of the written genres.
Readings about artificial intelligence	5 participants
Read definitions of basic concepts	5 participants
Read algorithms	4 participants
Read journals from the congresses	4 participants
Read the instructions to create a program	4 participants
Read definitions of technical concepts	4 participants
Read updated articles	3 participants
Read diagrams	3 participants
Write the instructions to create a program	3 participants
Write the code	2 participants

Write reports	2 participants
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In these lines, the information related to the written genres promoted by professors in their courses at university is presented. First, the activities in which the professors ask the students to read in English are described. Second, the activities in which the students are asked to write something in English are going to be described based on the data provided by professors in the interviews.

The following participants are the ones who motivate the students to read something in English in their classes focusing on their subjects. They clearly show the use of specific written genres in the classes of the academic setting.

Participant 1:

Students have to read some **texts** about Artificial Intelligence, basic concepts and new algorithms in English. I also ask my students to read **Journal articles** from the Congresses, **research on topics** of computing, Web pages, and forums to know more about the topics in which they are interested in.

Participant 5:

For my classes, students sometimes need to read **slides that include diagrams** about a specific topic. They also need to read **articles** that I share with them. Personally I provide some **links of articles** from “Horizon Report”, which is a magazine published in English.

Participant 6:

I ask my students to **do research activities** and they need to read. Another activity is in the programs; for example, they read **the codes** in English. I ask my students to read **manuals of the equipment** for many different activities.

As shown above, professors provide readings and articles about different topics of computer science field in English to their students in order to share updated information about the topics of their major. They usually ask the students to read the information and to get the most important ideas of the topics to perform a specific activity in the classes. It is

also necessary to report that professors motivate the students to read about research done on topics related to computing to invite them to do similar research. Students also need to read codes, diagrams, commands and manuals to program the equipment or to develop a system. Other resources that the participants use for the students to promote the written genres in the academic setting are power-point slides, links of articles, web pages and forums.

In the following lines, the information provided by the participants who motivate the students to write something in English in their classes regarding to their subjects is presented. These participants clearly demonstrate the use of specific written genres in the classes of the academic setting.

Participant 3:

For programming I ask the students to write **basic technical concepts** they need to use to create a program and those terms cannot be translated into Spanish. My students also need to write **commands** and **design algorithms** in English.

Participant 7:

Another activity that I ask my students to use English is when they have to write **their reports** from my subject; they only need to write technical words and concepts in the language. However, the rest of the report is written in Spanish.

Participant 8:

One activity that I use in the classroom is that students write **reports of use**, they also write about **the results and the specifications** of the use of equipment and the results of programming a system. They read the information in English, but they write the majority in Spanish.

As presented above, professors promote the use of written genres in English in their classes for specific courses mentioned before. Professors require the students to write instructions, commands, specific words, basic technical concepts and words all of them related to the computer science engineering field. They also ask the students to write algorithms and to do specific exercises of their subjects. Other activities where students need to use the

written genres in Spanish are to write reports of use and reports from their courses. They also need to write to design the programs and codes in some subjects and they often translate some texts to understand what they will use for their activities in the subjects. After analyzing the written genres in English used in the computer science engineering, the next section will show the oral genres in English used in the academic setting.

4.1.2.2 Oral genres

These genres are less used by the participants in their courses because of the low level of English of the students at University and it is more complicated to transmit the information for them.

Table 4

Oral genres promoted by professors in the academic context and number of participants.

ACADEMIC CONTEXT ORAL GENRES PROMOTED BY TEACHERS	Number of participants who promote the use of oral genres
Watch videos in youtube	5 participants
Watch a power-point presentation	4 participants
Watch conferences in English	3 participants
Watch tutorials	3 participants

Excerpts are presented in order to illustrate how those participants use the oral genres with the students in their classes. It is important to indicate that not all the participants use the oral genres for their classes and in their courses.

Participant 2:

I ask my students to **watch videos** in English on Youtube because there is a lot of material for them to learn aspects related to computer science and they can do certain activities with the information.

Participant 5:

For my classes I like to bring some **interesting conferences** and **power-point presentations** because the information is updated and the most recent research.

Participant 6:

I present **tutorials** in my classes because they are very helpful and students can understand better how to do something because they not only listen to the information but also observe how other people do it.

After analyzing the data obtained by the participants in the interviews, it is observable that some of them use oral genres to show videos to the students with the most updated information of the topics related to the subjects. Another oral genre the participants use in the classes is the projection of conferences with useful topics for the students' major. One of more oral genre used in the academic setting is the presentation of tutorials to help the students perform different activities in the field of computer science. The last oral genre they use is the presentation in power-point; the participants present the most relevant information about the topics of the subjects.

4.1.2.3 Sets of genres

After analyzing the written and oral genres used by the participants in the academic setting, it was necessary to indicate that often the genres are not used alone or separated. For certain activities, they are used in class and in some subjects are combined with other genres in order to achieve the goal and acquire the competence (Bazerman 1994, Bathia 2002, Swales 2004). In the next section, the cases when it has been necessary to use some genres to perform an activity will be presented with the participants' information.

Participant 1:

In the subject of Artificial Intelligence I need to provide some readings about several topics to the students, they need to read the information and research in more sites about the topic, and they

present what they have understood about the topic to their classmates. Then, there is some time for feedback about the information presented.

Participant 2:

I provide my students with videos and I ask them to write a summary or for example sometimes there are videos with examples of programs of a programming language like JAVA and they need to watch the video and do a practice, once they do the activity they hand in the program as a result of the practice.

Participant 3:

During my courses I ask the students to work on a project and for this project they need to configure a web, in the configuration they need to research about the topic either in books or on the internet pages, they have to read all the information and then write a manual.

As we can see in the information provided above, a combination of genres is used in order to achieve one product. They can be only written genres or a combination of written and oral genres (Swales, 2004). In most of these cases, the participants provide the material to the students either readings or videos. In the case of readings, they ask the students to research more about specific topics. Students need to understand the information and to translate what they did not understand. They have to do an assignment, write a manual, present the information to the class or to answer an exam. In the case of a video, they need to watch it, understand the topic, write a summary, or write a report and present the results to the teacher or to the class (Newell, 2006). It is important to highlight that genres work in groups and as professors it is necessary to take into consideration the genres that are going to be used to carry out an assignment or an activity in the class. After analyzing the results focused on the academic setting, it is time to move to the professional setting.

4.2 Genres used in the workplaces for Computer Science Engineers

Apart from analyzing the written and oral genres used in the academic setting, this study analyzed the written and oral genres used by computer science engineers in their professional settings. Consequently, the data obtained in the research will be presented in the following sections in order to observe the genres used by the alumni who develop their activities in the field of computer science at the workplaces.

4.2.1 Alumni perceptions

The written and oral genres used by the alumni in the workplaces depend on the time of experience they have at work, their position and area of work of their jobs. In order to present the results, the eighteen alumni who participated in this study will be divided into two groups: freshmen and junior alumni.

4.2.1.1 Freshmen alumni

The group of freshmen alumni involves the participants who have less time at work and as a result less experience regarding to the field of computer science. There are seven participants out of eighteen who belong to this category. The information of the participants will be described in the following table.

Table 5

Information regarding to the participants who belong to the group of Freshmen alumni.

	Years of experience	Place of work	Work area	Position
Participant 1	1 year	Bancomer Center	Area of frauds prevention and technological crimes	Analyst Programmer
Participant 3	2 years	Salinas Group	Express money	JAVA developer
Participant 7	1 year	AMATECH	Technical assistance in Infinitum support	Operator of technical assistance

Participant 8	1 year	AMATECH	Technical assistance in Infinitum support	Technical assistant
Participant 15	1 year	Research Department at the BUAP	Systems Development	Programmer Type B
Participant 16	1 year	Rassini Brakes	Systems Area	Programmer of systems
Participant 18	1 year	Cell fushion	Innovation	Software Developer

As seen in the table the seven participants who belong to the group of freshmen alumni have from one to two years of experience at work. They work at different companies in the region and near the region. All of them work in areas related to their field and they have the positions of operator, developer and programmer.

4.2.1.1.1 Written genres

Freshmen alumni consider they generally use written genres at their workplaces. They have to perform activities at work which are involved with the use of reading and writing. Some of the activities they do with the use of written genres in English are to read manuals, tutorials, official documents, commands, books, texts, posts, forums , opinions, menus and definitions. They also have to write commands, common words, instructions, comments, e-mails, technical reports and description of projects. In the following table the most common written genres used by freshmen alumni in the professional setting are listed.

Table 6

Written genres used by freshmen alumni in the professional context and number of participants.

PROFESSIONAL CONTEXT WRITTEN GENRES USED BY THE FRESHMEN ALUMNI	Number of participants who use the written genres at work
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Read manuals	7 participants
Read tutorials	6 participants
Read commands	6 participants
Read an instructive	6 participants
Read official documents	4 participants
Read menus	4 participants
Read definitions	4 participants
Read books	4 participants
Read posts	3 participants
Read forums	3 participants
Read opinions	3 participants
Write commands	7 participants
Write common words	7 participants
Write clue words	7 participants
Write instructions	5 participants
Write comments	4 participants
Write e-mails	3 participants
Write technical reports	3 participants
Write languages of programming	2 participants
Write the description of a project	2 participants

In the following lines, the written genres used by freshmen alumni in their areas of work are presented. First, the activities in which the participants need to read in English and second, the activities in which they have to write something in English are presented based on the data provided by the freshmen alumni through the interviews.

The following participants are the ones who need to read something in English in their areas of work at their jobs. Based on their comments, they clearly show the use of specific written genres in the workplace of the professional setting.

Participant 1:

I mainly use English to read the **texts, manuals** or the **information** that we get at work. The **documents from the best official sites** are in English. When I work on a project I have to read the **documents of JAVA** and everything is on the webpage, I also need to read **official documents** to perform my activities.

Participant 3:

In my job I need to read **manuals, tutorials, posts** most of the doubts that we have in order to do the **activities for a project** are found in different **posts, in forums of opinions** and everything is in English.

Participant 18:

I need to read **manuals** most of them are in English, in fact, in the company everything is in English and we have to write an e-mail or a message we do it in English. Let me tell you something Spanish is not the language for communication in the company, English is our language to communicate.

As presented above, freshmen alumni need to read manuals tutorials and official documents to perform specific activities in their jobs. They also need to read texts and books to continue learning about the updated information of their majors. They read posts, forums and opinions to solve their doubts about a specific problem in their work. Some of them also need to read menus and definitions to understand more about the problems related to their field.

In the next section, the data provided by the participants who need to write something in English at their workplaces is presented. Based on the information these participants demonstrate the use of specific written genres in their areas of work to perform certain activities in the professional setting.

Participant 3:

I use English to **look for information** on the Internet pages. Everything related to my job is in English so I have to **write the words** in this language.

Participant 7:

At work, I have to write **comments, clue words, instructions and commands** all the time. In Programming also all the **programming codes** are in English and the programming languages that we write are in this language.

Participant 18:

I regularly have to write **technical reports** when we correct an error we have to describe it in English, how we solved it and the **comments** about it in order to locate everything what we did. I also need to write **e-mails**, one of the most important parts is to know how to introduce yourself in English and to tell them that you can help. I also have to write the **information** to inform people about the description of activities when I am going to perform something.

As presented above the freshmen alumni generally write commands in order to program and to perform different activities in the programs that they deal with at work. They also have to write clue words and common words to consult information on the Internet. They need to write instructions while they are programming and they write comments about specific activities in their areas of work. At their areas of work, they have to write technical reports that are asked by their bosses. They also write the description of projects in order to inform the activities they performed and the way they did them (Bazerman & Rusell, 2002). After analyzing the written genres used by the freshmen alumni, it is time to analyze the oral genres.

4.2.1.1.2 Oral genres

The participants consider that they use oral genres fewer times than written genres. However, they perform certain activities orally. The oral genres used by the participants are listed in the following table.

Table 7

Oral genres used by freshmen alumni in the professional context and number of participants.

PROFESSIONAL CONTEXT ORAL GENRES USED BY THE FRESHMEN ALUMNI	Number of participants who use the oral genres at work
Short meetings	2 participants
Phone calls	2 participants

Chat with colleagues	1 participant
Report information	1 participant

As shown above, freshmen alumni use oral genres to attend short meetings at work. They also use English to communicate on the phone calls with clients who only speak English and report activities they have done at work. Furthermore, they also report they use the language to chat with some of their colleagues to practice and continue learning. In order to illustrate the cases when participants use oral genres in English at the workplaces, their information will be shown in the following lines.

Participant 8:

When the clients **call for assistance** and they cannot read the information because it is in English, I have to say the **words in English** to guide the people. I have to **dictate** to people through the phone. I **say the words** in English so they can guide themselves to follow certain **instructions**.

Participant 18:

I use English a lot in the **meetings** that we have at work. In this one we **plan the activities** of the day and everything that we are going to do; I have to communicate what I am going to do and also the other workers.

As presented above, the participants mainly use the oral genres for their short meetings at work. They need to communicate with their colleagues and bosses in English. They also need to communicate in the phone calls when they have to explain the clients the route they have to follow to perform an activity on their computers. Some of them use the language to chat with their colleagues at work and to practice the language. They also use oral genres to report the information when they develop their projects at work. After analyzing the written and oral genres used by the freshmen alumni, it is important to state the strategies they use to overcome a difficulty when they face a situation with the use of English language.

Freshmen alumni consider that to perform the activities at work using English for the written and oral genres is not easy due to their low level of English. Nevertheless, they explain that they applied some strategies to achieve their purpose at their areas of work. In the following lines the strategies used by the participants are going to be illustrated.

Participant 3:

When I face a difficulty with the language, I use the google translator and I put the page google United States in order to go directly to the United States site and there I translate the information.

Participant 7:

When I need to use English, I use the structures and vocabulary that I learnt at school from basic things to more advance.

Participant 8:

When I have problems with the language, I ask my co-workers for help. Sometimes, they are basic words but we forget them at the moment of speaking.

Participant 16:

Well, first I read the text or document to see what I can understand. I do a general reading and I see what I can understand.

As presented above, the participants consider that they read the information to get the general idea and to understand the topic. All the participants find the google translator as a very useful tool to get the meaning of words and complete texts, others ask co-workers for help. Therefore, they use diverse strategies in order to accomplish their tasks with the use of English in the written and oral genres at their professional setting. The next section will present the information related to the junior alumni to show the written and oral genres they use at their workplaces.

4.2.1.2 Junior alumni

The group of junior alumni involves the participants who have more years at work and as a result more experience regarding to the field of computer science. The information of the participants will be described in the following table.

Table 8

Information regarding to the participants who belong to the group of Junior alumni.

Number of participant	Years of experience	Place of work	Work area	Position
Participant 2	5 years	Farmapronto	Technical support	Technical developer
Participant 4	5 years	SEGLO Logistic	Systems Development	Specialist in applications development
Participant 5	4 years	Rassini Brakes	Systems area	Programmer
Participant 10	5 years	Government Department	Systems Development	Programmer
Participant 11	4 years	University	Robotics Department	Professor-Researcher
Participant 12	6 years	University	Workshops and Laboratories	Programmer
Participant 13	5 years	SKYTEX in Mexico	Systems Development	Programmer
Participant 14	5 years	AMATECH	Systems	Analyst Programmer
Participant 17	6 years	T-Systems	Technology Area	Remote Support

As seen in the table the nine participants who belong to the group of junior alumni have from four to six years of experience at work. They work at different companies in the region and near the region. All of them work in areas related to their field of study and they have the positions of specialist, professor-researcher, support, developer and programmer.

4.2.1.2.1 Written genres

Junior alumni believe that they use the written and oral genres in English more often in their workplaces. They have to develop different activities at work which are involved with the use of reading, writing and speaking. There are some activities the participants do with the use of written genres in English; for example, they read manuals, articles, web pages, documents, books, instructions, technical words, forums, twitters, user's interfaces, and examples of results. These participants have to write commands, reports, e-mails, manuals, user interfaces, articles, daily reports, questions, information and support. In the following table the most common written genres used by junior alumni in the professional setting are listed.

Table 9

Written genres used by junior alumni in the professional context and number of participants.

PROFESSIONAL CONTEXT WRITTEN GENRES USED BY THE JUNIOR ALUMNI	Number of participants who use the written genres at work
Read manuals	9 participants
Read articles (internet/magazine)	7 participants
Read web pages	7 participants
Read documents	6 participants
Read books	5 participants
Read instructions	5 participants
Read technical words	5 participants
Read forums	3 participants
Read twitters	3 participants
Read user's interfaces	3 participants
Read examples of results	3 participants
Write commands	9 participants
Write reports	7 participants
Write e-mails	6 participants
Write manuals	4 participants
Write user interfaces	4 participants
Write daily reports	4 participants
Write articles	3 participants
Formulate questions	3 participants

Take notes in virtual workshops	2 participants
Write support	2 participants

Table 9 shows the written genres used by junior alumni in their different areas of work. First, the activities in which the participants need to read in English and then those in which the participants have to write something in English are presented based on the data obtained by the junior alumni through the interviews.

The following junior alumni are the ones who need to read something in English in the areas where they perform their activities at work. Based on their information provided, they clearly show the use of certain written genres in the professional setting.

Participant 2:

Well, in English I have to read **topics** related to network, hardware and software; for example, I went to an interview and I had a **certification** exam in English it was SISCO level 4 and everything was in English. At work I mainly read **manuals** and **web pages**.

Participant 4:

Apart from **books**, I also read **manual instructions** to develop applications for a specific hardware dispositive. I sometimes read **documents** from the company. Mainly, I read **manuals, magazines articles, internet articles, twitters** for example from the Forebec Tec. I also read the **system** of my computer and I read the **user interfaces**.

Participant 13:

I need to read **books** in English for research, I also read **documents** or **manuals** to perform the activities in my area. When I have doubts I check the **forums** of programmers and the most important **information** is in English.

As presented above, junior alumni need to read manuals focused on software and hardware to perform the programming in their work areas. They also need to read technical vocabulary which is in documents, books and manuals to develop specific activities in the company. The participants check forums to solve their doubts because in those forums there

is important information related to the computer science engineering. Some participants read the information in twitter because it is updated. They also read magazine articles and web pages because they provide useful information for the participants when they have to do specific activities in their work areas. Some others read the interfaces of application when they are creating a program or a system.

In the following section, the data provided by the junior alumni who need to write something in English at their workplaces is presented. Based on the information provided by the participants, they clearly demonstrate the use of specific written genres in their workplaces to perform certain activities in the professional setting.

Participant 2:

I write **information about the activities** that I will do, like a **report** about the hardware and software that I am using at work. When I have contact with suppliers I need to communicate with them through **e-mails**

Participant 4:

At work, we are developing new versions of a system that we do to implement in other countries and we are doing it in English. We are going to write the **user interfaces**, the **user manuals** and the **support**.

Participant 11:

For example, I write **articles** in English because we compete in national and international contests. We had a competition in Turkey and all the process requires the English language because we write **articles, web pages**, and we need to attend the **contest**. I also need to write **research articles** to send them to the contest committee.

As presented above the junior alumni need to write commands as part of their daily work lives. They also need to write reports at their work areas and specify the activities that they did or the ones they will do in a specific project or as part of their daily work routine. In

order to communicate with their suppliers, they need to send e-mails for information or doubts. They have to write manuals related to the systems or programs they create or manage in their work areas. They also write user interfaces, articles and support for the programs and systems that they create for other clients and companies. They need to formulate questions when they need to know more about a topic, and they write information in virtual workshops. After analyzing the written genres used by the junior alumni, the next section to be analyzed is the oral genres.

4.2.1.2.2 Oral genres

The participants reported that in their work areas, they need to use the oral genres for several activities. Oral genres in English have a significant place to perform their activities in the professional setting. The ones used by the participants are listed in the following table.

Table 10

Oral genres used by junior alumni in the professional context and number of participants.

PROFESSIONAL CONTEXT ORAL GENRES USED BY THE JUNIOR ALUMNI	Number of participants who use the oral genres at work
Conversations with clients	5 participants
Phone calls	5 participants
Chat with colleagues	4 participants
Meetings	4 participants
Explanations	3 participants
Descriptions	3 participants
Conferences	2 participants
Participation in a contest	1 participant
Virtual classes	1 participant
Virtual workshops	1 participant

As shown above junior alumni use oral genres in English to establish conversations with their clients and to make phone calls with their clients or suppliers. They also need to use English to chat with their colleagues and to have meetings at their areas of work. They also provide explanations about specific topics of their areas and descriptions about the programs or the activities they perform in their daily work routines. The participants also need to talk in conferences related to their field and they participate in contests. They attend virtual classes and workshops. In order to show the cases when junior alumni use the oral genres in English at their areas of work, the information will be illustrated in the following lines.

Participant 11:

When we go to international contests we **communicate** in English with other participants during the entire contest and we have **meetings** to organize.

Participant 12:

I sometimes need to **explain** different aspects of work in English. When we **presented** the interdisciplinary system of Informatics and all the **description of the project** in the same language.

Participant 13:

I need English when I have to establish **contact** with people in **forums** and these people speak English. There are many **web pages** that provide **online help** in English, I can also take **virtual classes** and the instructor speaks this language. The **workshops** are also presented in English and I need to ask questions and get information in this language.

Participant 17:

I use the language to make **phone calls** with the clients, the client sometimes asks about the projects and the leaders need to **explain**. I also need English to **establish communication** with American people because sometimes they come to the company.

As presented above, the participants need to use the oral genres to communicate with the clients and to make phone calls with clients and suppliers to solve doubts and to provide

information about the management of the systems. They also chat with their colleagues about the topics of their areas. They also have some meetings where they discuss different topics of their areas. The participants present explanations about significant topics of their workplaces and also they present descriptions of projects when they develop them at work. The junior alumni attend conferences in English, they also have virtual classes and workshops where they need to use English as means of communication. Once the written and oral genres used by the junior alumni have been presented, it is necessary to list the strategies they use to overcome a problem with the use of English at work.

Junior alumni report they sometimes face problems with the language when they have to perform a written or oral genre at work. In those cases, the participants use strategies to overcome the problem. In the next lines the strategies used by the participants are going to be presented.

Participant 4:

I try to focus on common phrases for example if I have to write a manual, I look for another manual in English and I copy the style of writing. Regarding vocabulary I look for the words that I do not know.

Participant 5:

I use the google translator when I do not understand a word. I also ask to my friends about the words that I do not know or to my teacher I ask the doubts about vocabulary and she helps me.

Participant 13:

When I face a difficulty I use the google translator and I translate the page. However, I check the information carefully because sometimes the translator provides a word that does not belong to the technical context.

As presented above, the participants consider that the strategies they use are the ones that function well for them. Some of the participants consider that a good strategy is to ask other

people, colleagues or teachers about their doubts. Other participants read all the text and try to understand the main ideas, then they look for unknown words in a dictionary or translator. Most of the participants consider that the best tool for them is the use of google translator because it is easier and faster to solve their difficulties with it.

4.2.2 Employers requirements

Employers play a particularly important role in this because it is necessary to know what these participants consider to hire a computer science engineer in their companies. Both employers agree that “English is very important for the engineers who are in the floor and for the ones who are in the different areas of systems”. In both companies they buy machines from foreign countries and the language they use is English. Both employers require computer science engineers who have a good level of English; they pointed out that the workers need a 90% of English in the four skills (listening, speaking, reading and writing). In the two companies there is an area of systems where they require computer science engineers and professionals with a bachelor’s degree; however, these workers provide support to all the other areas in the company. These companies offer the positions of programmer, technology workers, telecommunications and infrastructure, technical support, and systems consultant. For all these positions, English is especially important because all the **manuals** that the programmers have are in this language. The employers consider that the computer science engineers mainly need English to perform written genres at work. However, they also need to use certain oral genres to develop their activities in the professional setting (Bazerman, 2006; Bazerman & Rogers, 2008a, 2008b). As a result, in the following lines the written and oral genres required by the employers for computer science engineers to develop their activities at work are going to be presented.

4.2.2.1 Written genres

Focusing on the written genres, the employers consider that computer science engineers they hire need to read and write certain genres in the different areas of work where they perform their daily activities. The written genres are going to be divided in the ones that the employers need the computer science engineers need to read and the ones they need to write in their workplaces at their companies.

Employers from the two companies require the computer science engineers to do the following activities with reading and writing:

Participant 1:

In the company, computer science engineers need to read **manuals** related to the topics of programming, they also need to read **e-mails** from the suppliers when they provide specific information about the equipment.

Participant 2:

In the company computer science engineers need to read **manuals** and **e-mails** because the corporate is located in the United States. The e-mails with the suppliers need to be read in English because some of them are also in the United States. The engineers also need to read the **technical papers**, and **specifications**, mainly the **instructive**.

Participant 1:

Well, often the computer science engineers need to write the **manuals for software** that we manage in the company. The engineers also need to write certain **commands** specific for programming and when they **look for information** on the web they need to search the information in English. It has to be done in this language because the information is more updated and the best **articles** and **documents** are in English.

Participant 2:

At the company the computer science engineers need to write **programs**, **official documents**, **e-mails** and **instructive**. They need to write the **e-mails** asking for specific information to the suppliers, they also ask for specifications and help. They also need to write the **description of the**

projects that are developed in their areas of work. They need to write the **description of their activities** when they are in the different areas.

It is important to take into account that employers need the computer science engineers to read manuals related to their field, they also need them to read e-mails with specific issues of the company. They need to read technical papers, specifications and instructive regarding the equipment. On the other hand, according to the employers, the engineers have to write manuals for software, commands and clue words for instructions. They also need to write programs, official documents and instructive. They have to write e-mails asking for specific information. Finally, they need to write descriptions of the projects and the activities they perform at the work areas. In the following lines the oral genres are going to be presented.

4.2.2.2 Oral genres

Employers consider that computer science engineers also deal with the oral genres at the workplaces. They say that the engineers use oral genres fewer times than the written genres due to the activities they have to perform at the areas of work. In the next lines, the ideas provided by the employers are presented:

Participant 1:

Regarding to the oral activities, the engineers need to communicate through **phone calls** and sometimes when the suppliers come to the company they also need to **talk** to them about the requirements of the company. The engineers also need to **communicate** in English when there is a problem with the software installations and they need to **ask for** validations of a problem, they need to explain about it.

Participant 2:

In the company, computer science engineers need to communicate orally in a **meeting** because they have to talk about different topics related to their activities in the areas of work. They also need to

communicate through **phone calls** with the clients and the suppliers. In the company, the engineers need to **communicate with an organizational unit** in the United States in Detroit in Michigan, they sometimes come to the company and they **communicate with the engineers** to solve doubts about the computer equipment mainly the software and the design.

As it has been demonstrated oral genres are used in the companies in order to accomplish certain activities required by the companies. The employers consider that the oral genres are sometimes difficult to manage by some computer science engineers because of their lack of vocabulary and appropriate fluency with the language.

4.3 Chapter summary

It is vital to emphasize that when the students are majoring in a field their perceptions are quite different from the ones when they are working at the real sites. The written and oral genres in the Academic setting vary from the ones that are used in the Professional setting. After analyzing all the data obtained from the different participants involved in this research, it is important to indicate that there are certain written genres that are used in the academic and professional settings. Nevertheless, there are certain written and oral genres that are used specifically at the academic or professional setting. In the following tables a complete view of the written and oral genres used by computer science engineers is going to be illustrated.

Table 11

Similarities and differences regarding to the use of written genres in the academic and professional settings.

WRITTEN GENRES		
Written genres used both in the	Academic setting	Professional setting

academic and professional settings		
Read manuals focused on the field	Read internet blogs	Read tutorials and instructives
Read web pages		Read e-mails
Read books in English		Read menus and definitions
Read journal articles (Internet/magazines/congresses)		Read forums
Read commands, instructions, specifications, basic concepts and technical words		Read posts and twitters
		Read opinions
		Read examples of results
		Read official documents
Write short phrases, technical words, commands and instructions	Write the code	Write programs. Instructive and user interfaces
Write information for consultation on the Internet	Write short messages on facebook	Write e-mails asking for and providing specific information
	Write abstracts	Write technical reports
	Write practices	Write the description of projects
		Write languages of programming
		Write manuals
		Write comments
		Write daily reports and description of activities
		Write articles and official documents
		Write information in virtual workshops
		Formulate questions
		Write support

As seen in the table 11 the participants need to read numerical methods, algorithms, diagrams, user's interfaces, commands, instructions, specifications, basic concepts, technical words, manuals, books, web pages, and journal articles to perform their activities in their academic and professional lives. In both settings, they need to write short phrases,

technical words, commands, instructions and information for consultation on the Internet to accomplish their required activities. However, there are certain differences in the use of the written genres. Participants need to read internet blogs in the academic context while in the professional context they need to read tutorials, instructives, menus, definitions, forums, e-mails, opinions, posts, twitters, examples of results and official documents. Academically they need to write codes, abstracts and short messages on facebook; whereas, professionally they need to write programs, languages of programming, user interfaces, instructives, manuals, technical reports, daily reports with descriptions of activities, description of projects, articles and official documents, information in virtual workshops, support, comments, e-mails, and they formulate questions. The written genres used in the academic setting are less than the ones needed for the activities at the workplaces.

Table 12

Differences regarding to the use of oral genres in the academic and professional settings.

ORAL GENRES	
Different oral genres	
Academic setting	Professional setting
Watch and listen to videos on the Internet/youtube	Phone calls
Watch and listen to tutorials	Chat with colleagues
Watch conferences in English	Meetings
Watch a power-point presentation	Conversations with clients
	Report information
	Attend conferences
	Explanations, descriptions, validations
	Virtual classes and workshops
	Participation in a contest

Focusing on the oral genres, the analysis of the information shows that there are not similar genres used by the participants in the academic and professional settings. Nevertheless,

there are certain oral genres used at university which differ from the ones used at the workplaces. On one hand, in the academic context the participants need to watch and listen to videos on the Internet/youtube, tutorials, conferences and power-point presentations. On the other hand, in the professional setting the participants used more specialized oral genres to accomplish their activities at work. They have to explain, describe and make and receive phone calls, chat with colleagues, talk to clients, attend meetings and conferences, report information, participate in contests, attend virtual classes and workshops.

CHAPTER FIVE: CONCLUSIONS

- 5.0 Chapter overview
- 5.1 Summary of answers to RQ1 and RQ2
- 5.2 Study and pedagogical contributions
- 5.3 Limitations of the research
- 5.4 Possibilities for further research
- 5.5 Personal reflection

5.0 Chapter overview

In this chapter, a summary of the answers to the RQ1 and the RQ2 is presented as well as the answers for RQ1.1 and RQ1.2 underlining this study. Then, the study and pedagogical contributions, study implications and recommendations, limitations of the research, possibilities for further research and a personal reflection will be presented.

RQ1: What are the English written and oral genres Computer Science students in this field need to acquire to develop professionally?

RQ1.1 What do the current students report they need to use English in this academic setting?

RQ1.2 What English written and oral genres do professors report students need in this academic setting?

RQ2: What are Computer Science alumni's and employers' perceptions regarding the English written and oral genres professionals need to acquire to develop professionally in the field at the workplace setting?

5.1 Summary of answers

The use of English plays a significant role in the lives of computer science engineers in both settings academic and professional. They need English to perform different activities with the written and oral genres at university and workplaces (Paltridge, 2006).

English is one of the main challenges for students in the computer science engineering major due to the different tasks that need to be performed with the language. This is one of the reasons for the high desertion rate of students in the program because they are not able to accomplish all the written and oral genres required in their subjects in this program.

It is important to highlight that at the university English is mainly used for activities in their formative subjects. Both participants; students and professors agree they use English for written and oral genres in the following subjects; Numerical methods, Mathematics IV and V, Graphing, Distributed Systems, Database, Distributed Database, Fundamentals of Programming and Webs.

In these subjects there are some written genres students can use without major difficulty such as: to read definitions of basic and technical concepts, instructions, web pages, internet blogs and numerical methods. They can also write short phrases in class, commands, instructions, and information for consultation. However, some of the written genres required by the professors are very demanding not only due to the students' low level of English but also because of their difficulty. Students have problems reading books which are written by experts in the field because they generally present new content knowledge and they are written in English which is also a real challenge for most of these students. However, one of the genres that students struggle with most is the research article. These are written by experts for experts on the subjects. So, they present an

additional difficulty. Another overly complicated activity for students is to write reports in their subjects because they lack the abilities and competences to perform this activity appropriately. Therefore, most teachers ask them to write in Spanish.

Regarding the oral genres, they are less used than the written ones in academic settings. This is probably because they need them less and speaking is always harder for the students to develop in a second language. However, professors asked students to watch conferences, tutorials and videos on the Internet to understand topics focused on their major. It is a good strategy that professors use updated -material in English; nevertheless, the students experienced anxiety when they do not understand the message. This complicates the purpose of the use of oral genres and students reported the necessity of acquiring English focused on their major during their studies.

Alumni commented that after they graduated and they got into the workplace, they were not able to perform all the written and oral genres required in English by the companies. Therefore, their lack of English could become a barrier to obtain a better position. As a result, many took English classes to improve their English level and to achieve their goals at the companies. Nonetheless, the general English courses often did not help them as much as they needed. They explained they were able to improve their language skills through their classes, but they needed more English focused on computer science engineering to be able to perform the written and oral genres used at their workplaces. Alumni were able to learn to use the basic written and oral genres in their workplaces; however, they could not use the ones which required higher levels of English.

Both freshmen and junior alumni need to read definitions, commands, instructions, forums, manuals, official documents, books and articles. Depending on the years of experience and their positions, junior alumni also need to read web pages, twitters, user's

interfaces, and examples of results. The difficulty of the use of written genres increases when the computer science engineers acquire higher positions and more demanding activities at their jobs. Freshmen and junior alumni need to write commands, instructions, common words, technical and daily reports, comments and e-mails. These are some of the basic written genres they need to carry out their daily activities at work. Nevertheless, junior alumni also need to write manuals, interfaces, articles, information and support for the clients. They need to develop more specialized activities in the written genres.

It is important to highlight that in this academic setting the use of oral genres is less common than in the professional setting. Computer science engineers need to use more oral genres at their workplaces because they develop more activities with the use of English. Freshmen and junior alumni reported they needed English for their meetings, phone calls, chat with colleagues and to report information. Junior alumni also use English for explanations, descriptions, conferences, participation in contest, virtual classes and virtual workshops.

Employees reported that computer science engineers need to use written and oral genres at their workplaces. Engineers need to read manuals, e-mails, technical papers, specifications and instructions. They also need to write commands, instructions, technical words for consultation, manuals for software, programs, official documents, e-mails, description of projects and activities. Regarding the oral genres, computer science engineers need to make phone calls, talk to clients, attend meetings, to communicate with other engineers in the USA.

The use of written genres in English is particularly important in both academic and professional settings in the field of computer science engineering. However, the use becomes more complex in the workplace and even more as the engineer advances in his

career; not only because of the genres they must use for professional purposes, but also because of the ones they need for social and networking purposes such as emails. (Garrett & Baquedano-López, 2002).

The use of oral genres increases significantly in the workplace. These oral genres used in the workplace have often both professional and social networking purposes. Thus computer science engineers know that their professional development is related to their English level.

The use of isolated genres in academic settings tends to be more common but in professional ones it rarely the case that a genre is used isolated from others. In many cases it is necessary to use a combination of them to perform the activities required at university or at the companies (Bazerman 1994, Bathia 2002, Swales 2004).

5.2 Study and pedagogical contributions

This study contributes to the field of written and oral genres used by Computer Science Engineers at different levels of their academic formation and professional development in this specific context. It also contributes to implement at the university where I work communities of practice in two main areas at the beginning: the English Academy and the Computer Science Department. Professors can share information about different topics regarding their areas through the regular interaction for the benefit of the students and the institution.

Regarding pedagogical contributions, it could be interesting to show the findings to the professors and the Academic Director to suggest some relevant changes in the Academic Program for the English subject. It could be a great contribution to design at least two courses focused on English for Specific Purposes and to include the written and oral

genres obtained from this research. It could prepare the students to deal with those genres for their future professional setting and to acquire the appropriate language to deal with their workplace activities.

5.3 Limitations of the research

One of the limitations of this study was the number of alumni and employers. It was only possible to carry out this research with a small number of alumni and two employers. The results obtained for the written and oral genres used in the professional setting were specific to this particular group of alumni and employers.

Another limitation was the time availability of the alumni for the interviews; due to their work schedules and activities, it was difficult to contact them and to conduct the interviews. In addition, due to time and availability constraints, only two employers participated in this study. In order to interview them, it was necessary to go to the two companies and there was also a problem with the confidentiality of the information.

5.4 Possibilities for further research

In the light of the limitations stated above further research would need to address the number of alumni and employers participants. A large number of alumni participants would provide more data related to the written and oral genres in English used in the professional setting. Likewise, to interview more employers would provide a wide variety of written and oral genres required at the companies to perform different duties by the computer science engineers.

In addition, another possibility for further research would be to gather examples of the written and oral genres used by computer science engineers at the companies based on

the years of experience, positions and activities to be performed. These texts could be analyzed using corpus analysis which is a trend in ESP today. It would be necessary to apply needs analysis to explore these genres and to prepare adequate materials to develop courses focused on English for Specific Purposes at high levels of university.

Another possible line of research is to conduct similar studies in other majors offered by the Technological Universities in different states. These studies would provide authentic data for the real context in our country. The data would allow the researchers to have a complete view of the written and oral genres used by the participants. The findings would be used to create courses at Technological Universities focused on English for Specific Purposes.

5.5 Personal reflection

In this last section of this study project I would like to share my personal experiences in the realization of my thesis for the masters. This reflection is shown in four stages: 1) the beginnings of the project, 2) the project development period, 3) the ending, and 4) my personal changes and growth as a result of all this process.

First, I will write about the beginning of the research project. Since I have always been interested on my students' language learning, I was worried about what my students needed to be able to read and write for their professional setting. Therefore, I became interested in doing my research regarding the academic and professional settings. When I got into the masters, I presented a project focused on the students' needs to change the teaching strategies for students' significant learning. Nevertheless, through my studies in the master I became aware that I could work for my research on the written and oral genres

used in the academic context as well as the professional setting. Consequently, I focused my research on this topic and on English for Specific Purposes.

During the development of my research project, I realized that doing this kind of research was a challenge because it was focused on two different settings the academic and the professional one. I became aware of the importance to design the appropriate instruments to obtain the data because to interview the participants was possible only one time due to their time availability. I realized the importance of piloting the instruments to identify weaknesses and make necessary changes before using them. Another aspect that was vital for the development of my research project was certainly the advice and guidance that my advisor provided me all the time. I can confess that sometimes it was hard for me to focus on my main topic mainly in Chapter 2 because I considered there was too much information to include. However, my advisor helped me all the time to follow the same path for my main topic of research.

Regarding the ending period of my research, the guidance of my advisor was vital because she trusted me and motivated me to conclude with my research project to be able to graduate. My advisor always found different strategies to help me to write the different chapters of my thesis. It was also extremely useful for me to get several interesting articles and books recommended by my advisor.

Finally, I will write about the personal changes I experienced while living all the process of writing my thesis. After doing this research, I consider myself a different person and teacher. I developed both personally and professionally and I am able to carry out research and investigate about topics that I am interested in professionally. All this process that I lived has allowed me to do more research projects regarding my teaching context and I have been able to motivate and guide my colleagues to start doing research with me. In

addition, I became more aware of my students' needs and I have made changes on my teaching practices. I started to include in each unit of the English program one activity focused on English for Specific Purposes.

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