University Of El Salvador

FACULTY OF SCIENCES AND HUMANITIES
DEPARTMENT OF FOREIGN LANGUAGES

A DIAGNOSIS OF TECHNICAL ENGLISH NEEDS OF ELECTRICAL ENGINEERING STUDENTS OF THE UNIVERSITY OF EL SALVADOR

UNDERGRADUATE THESIS PRESENTED
IN ORDER TO OBTAIN THE DEGREE OF

"LICENCIADO EN IDIOMA INGLES"

BY

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TO:

ERICK

AND

KATIA

PABLO

With special dedication to:

God, Almighty, for his guidance;
My parents, Luis Alonso and Aracely;
My wife, Ana Rosa;
My children, Claudia Lissette and
Jairo José;
My brothers and sister, for their
love and understanding.

Matthew

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INTRODUCTION

> The more closely a second language teaching is based on the identified uses to which a specific group of students will put the language, the more successful and effective the course will be. 1/

The seed that gave birth to the present work was an experience of the authors with an Electrical Engineering student approaching graduation. This student needed to read literature in English for his thesis work; and according to his own words, he had not learned anything in his English I Course, because at that time he had not been aware of the importance English had for his major. He realized his mistake when he found himself unable to comprehend the information sources in English. However, after taking some lessons, this upper-level student proved to be a fast English learner. Even with some hardships, he could gain access to the bibliography in English in about three months.

The student's accomplishment showed the authors of this work that a person can manage to read scientific English if he receives the adequate help and is sufficiently

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1/ David E. Eskey "Advanced Reading: The Structural Problem," English Teaching Forum, XIII (1975), 210.

motivated. The above mentioned student was eager to obtain his academic degree in the shortest possible time. Who would deny that he was well motivated?

A similar difficulty is experienced by almost all the students of the University of El Salvador, and the problem may continue endlessly if authorities do not acknowledge the situation. The Faculty of Sciences and Humanities has already increased the number of class sessions from four to five a week for the students of the service area during semester II-1988-89. However, this will not help much if the students' real needs are not considered in the course desing.

This research focuses on the students of Electrical Engineering because in addition to the event explained at the beginning, the authors gained an intimate insight of the problem while teaching English in the School of Electrical Engineering in the year 1987. A year was long enough to permit them to understand the students' needs and interests. But because there were no works related to the subject on which to base a program, they could not do much. In addition, the methodology and contents to be used were dictated by the coordinator of the subject. As a result, the other teachers, including the researchers, were largely limited and they ended up doing a mediocre job of English

teaching.

Though no curricula, programs for English, or even handouts used in teaching, have been found, this research attempts to collect and process all the information on which a program for Electrical Engineering students can be based. The work embodies information such as content, methodology, number of class-hours, and most, the desirable skill to be taught.

This work does not presume to solve the problem of English reading in the School of Electrical Engineering by itself; however, it represents an obligatory first stage that cannot be skipped. No solution can be reached if the problem is not understood. Therefore, it becomes necessary to evaluate the elements that produce the problem: the attitudes of the people directly involved in the teaching of English at the School of Electrical Engineering; the books or articles students are bound to consult; and the methodology used by English teachers.

Besides providing a view of the elements of the problem, the research presents some theories on reading which yield a scientific basis for possible solutions to the process learning to read English which is the main concern of this work. This theoretical frame can be applied not only to the students of Electrical Engineering, but also to all the schools and departments of the University

of El Salvador. Since English has become the language of new technology to the extent that the whole range of human knowledge uses it to report new findings.

The field of Electrical Engineering, being a rapidly changing one, deserves the authorities' attention in order to help its students to cope with the sources written in English. Electrical Engineering has included fields such as electronics and computation, which change so quickly, that Spanish translations will never reach them in time. Therefore, it becomes absolutely necessary for these students to be able to read technical English. That reading skill would enable them not only to understand foreign technology, but also to create their own Salvadorean technology perfectly adapted to Salvadorean needs. Reading English will smooth this difficult task for the students by providing a better comprehension of foreign technology.

This work is devoted to Electrical Engineering students because it is based on their needs and aspirations. A great amount of time and effort have shaped this research. Therefore, it is hoped that the people involved in the problem exposed here will value it as a contribution towards the solution to their particular difficulties.

The success of this work depends upon its continuation. A diagnosis is useless unless it is known, studied

and acted upon by the people involved. An English reading program based on this research is the responsibility of the Electrical Engineering authorities. Upon them rests the extension of this work and therefore its success. Those authorities may feel sure that Electrical Engineering students will be better prepared if their complaints echoed in this work are taken seriously. No one should forget that students are not just names in a roll, but real men and women that may profit from this work and other researches that may and should follow it.

I

STATEMENT OF THE PROBLEM

At the University of El Salvador, most students are bound to read publications in English because it is very difficult to find information in Spanish. In those cases when students are lucky enough to find those sources in Spanish, these are expensive, scarce and affordable by only a few. Furthermore, not all the material is translated; specialized reports and periodicals, for example, seldom are. Therefore, only a small number of students can take advantage of the new literature written in English.

The critical need to read a bibliography in English is felt in all the faculties of the University. Students of Medicine, Journalism, Chemistry, Law; as well as students of Physics, Biology, Odontology, Electrical Engineering, can witness this fact. This need can not be satisfied because most of our university students have little knowledge of English. Neither can it be overcome by the University through the translation of such a bibliography, since it does not have the neccesary resources to do it. Waiting for translations to come out does not work either because they become outdated from one year to the next.

There are some areas of human knowledge where changes and advances occur faster than others. This makes the ne-

cessity to read English a crucial factor in keeping pace with technological developments. One outstanding example of such a fast-changing field is Electrical Engineering. When students go to bookstores looking for technical books about electronics, for instance, they find many books about vacuum tubes which are no longer used, or a few about transistors, also fallen into disuse, but books concerning integrated circuits and microprocessors, precisely the material most widely used to make low-priced equipment, are not easily found. Even children's toys are made with a single microprocessor which controls all the movements of the electronic device. Unfortunately, very few books and magazines about these latest developments have been translated into Spanish. More important, these translations have to be brought from foreign countries and are, consequently, quite expensive.

The students of Electrical Engineering, as well as the other students of the University of El Salvador, have already taken six years of English instruction as part of their academic load in "Tercer Ciclo" and "Bachillerato." Their learning, however, has not been significant and consequently come to the University with only a vague and scattered knowledge of English. That is the reason why the teaching of English at the University starts as if the students had never had English instruction. It is a fact that

the courses begin with the teaching of the simple form of BE, although it has already been drilled on for six years. Starting on such a basic level, what results can be expected with only forty hours of class sessions?

However, the students' limited knowledge of English, and the insufficient time devoted to English instruction in that school are not the only elements producing the students' inability to take advantage of the bibliography in English. There is also the basic design of the programs.

Before 1986, the Foreign Languages Department of this university helped the Faculty of Engineering and Architecture with the teaching of English. It was expected that the especialists, the Languages Department's English Teachers, would do a good job and prepare the students to read technical English. Unfortunately, although this department is quite knowledgeable in the teaching of English, through the work of the service area, it did not do the preliminary task of gathering the information to accurately access the students' real needs. Thus, the results of the courses taught without the awareness of such needs is seen in the fact that the students who took English I are still unable to use information sources published in that language.

From 1986 on, the Faculty of Engineering and Architecture has been in charge of English teaching at the School

of Electrical Engineering. This means that the faculty has had to hire its own teaching staff as well as to approve the programs to be used. Nevertheless, the students' needs, as to English, have been ignored once again and the programs designed to teach it do not include the elements appropriate for the majority of students who, ironically, belong to the School of Electrical Engineering. 2/ Thus, in this program, it can be seen that the contents prepared for the students barely respond to the English necessities established by the bibliography they use. The handouts contain mostly material related to Chemistry. In addition, these handouts are full of mistakes and do not have a clear purpose. Elements such as the present progressive, future with going to and phonetics are taught; and the techniques used are dialogues, repetition drills and oral questions; although successful are dated techniques used to teach speaking. These are some of the activities often found in an English class session in the School of Electrical Engineering. Some teachers still use the old-fashioned Grammar-Traslation Method which is particularly ineffective in fields such as Electrical Engineering, where new vocabulary is coined constantly.

Another surprising fact in the teaching of English

2/ See appendix G

in that school is seen in the teachers' efforts to make the students learn all four language skills simultaneously in a single term. This attempt would not be more outrageous and utopian, because it is obvious that one term is too short to carry out a task of this magnitude.

The thoughtless planning and execution of the English I courses has led unavoidably to the students' general dislike for the subject. They show their dispirited attitude by not going to class, by not doing their homework assignments, by not participating in class, by arriving at class late, and/or by leaving it early, arguing that they have another class immediately, and by saying that English is not as important or difficult as the other subjects. This negative attitude toward English has long been displayed by students of this school as well as by students of the other different schools of our university.

In addition to the scarce attention given to English by the students and most of the professors in the School of Electrical Engineering is the fact that this subjec is taught to large, heterogenous groups. In some of them, there are students who study different majors such as Electrical Engineering, Food Technology, Mechanical Engineering, Physics, and Mathematics. Some of these students also belong to different levels: freshmen, middle level, and seniors.

This fact decreases even more the possibility that they can learn to read English literature. Since the best intentioned, resourceful teachers will find that in a heterogeneous group the students' interests are far from being the same. Therefore, it becomes impossible for the teacher to adapt the teaching material to satisfy everyone's needs. Once more, the students complain that they do not receive the type of English they expect to read for their academic activites, especially for such works as research papers and necessary graduation works. When the students are asked to write these kinds of papers, they realize that their English background is not good enough to handle the information sources written in that language. Unfortunately, by this time, they have already taken their obligatory English I course, which they never faced seriously.

The lack of studies about the problem faced by these students, that is, their incapability to read English, is a big handicap for anyone who tries to prepare a program. It also prevents English teachers from using the right teaching materials and methodology, because the students' needs concerning English are not known. Therefore, the first problem to be tackled is to find the lexical and structural characteristics of Electrical Engineering's reading material and the actual English background of the students of

that major. Considering the problematic situation described above a critical question arises: What are Electrical Engineering students' needs concerning technical English?

II

SCOPE AND LIMITATIONS OF THE RESEARCH

A: Scope of the Research

1. The diagnosis of Electrical Engineering students' needs concerning English provides a starting point to solve the problem of the English bibliography and the students' incapacity to read it. The findings and the conclusions drawn should be taken into account by those interested in the planing of realistic courses to bridge the gap between the information available in English and the students' capacity to utilize it. Hopefully, this work will be read and assessed by the authorities of the School of Electrical Engineering, and used as a reliable basis to solve the students' problem.

2. The present investigation also attempts to produce a change of attitude toward English, as a subject, among students, professors and authorities in that school. Given such a change, they all should see English not as a "filler" but as a necessary subject, deserving as much attention as the others. Thus, they will allot more learning hours and a new teaching approach, with the help of specialists.

3. It is also expected that the diagnosis work will encourage other researchers to turn their attention to

other schools and departments suffering similar limitations with the literature in English; for example, areas such as Biology, Psychology, Law, Mathematics, Physics and Journalism.

B. Limitations of the Research

1. The lack of cooperation of some faculty members toward the investigators. From eighteen professors at the School of Electrical Engineering, just five found time to give interviews. This fact deprived the researchers of more information that would support or deny the one already existing, since the whole population was originally targeted for consideration.

2. The students pronounced absenteeism from English classes. This phenomenon somehow distorted the sample that was used because there is, obviously, a big difference in attitude toward the subject between those who came to class (either on time or late) and those who showed up only for the examinations.

3. The loss of valuable information sources, such as academic records and bibliography useful for the present investigation due to the military interventions that the University of El Salvador has experienced. At the Office of Academic Records of the Faculty of Engineering

and Architecture, the researchers could not find documents concerning the origins of Electrical Engineering, its successive study plans, and the beginning of English instruction, or about the English programs used.

III

OBJECTIVES OF THE INVESTIGATION

The work the investigators plan to carry out contains five objectives referenced as follow: a general objective and four specific objectives.

I. General Objective:

To make a diagnosis of the Technical English reading needs of Electrical Engineering students of the University of El Salvador.

II. Specific Objectives:

1. To determine Electrical Engineering students' ability to read Technical English, before they have taken the English I course.
2. To identify the vocabulary and grammatical structures most used in Electrical Engineering Technical English literature.
3. To learn the main problems that these students face when tey read technical books in English.
4. To identify the negative attitudes that interfere with the process of learning to read Technical English.

IV

HYPOTHESIS AND VARIABLES

Since a qualitative analysis of the present conditions of English teaching at the School of Electrical Engineering of the University of El Salvador is planned, the work shall be guided by one working hypothesis only.

Therefore, the following hypothesis is proposed:

> Electrical Engineering students of the University of El Salvador need to develop the ability to read Technical English.

In the previously stated hypothesis, the following variables are found:

1. Independent variable:

The current technical bibliography for Electrical Engineering is published in English.

The indicators of the former variable are these: (a) latest technological developments reported in English, (b) highly-priced translated books in Spanish, and (c) subjects with no texts in Spanish.

2. Dependent variable:

The students' necessity to read Technical English.

This variable contains these indicators: (a) late incorporation of the students to the newest technology, (b) students' difficulty to buy highly-priced translations, and (c) students' obligation to read texts in English.

3. Intervening variables: (1) the negative attitude toward English found in the students; (2) the methodology used by the English teachers in the School of Electrical Engineering.

The first variable contains these indicators: (a) students' absenteeism, (b) little participation in classroom activities, and (c) lack of interest in turning in homework assignments.

The second variable contains the following indicators: (a) inappropriate teaching materials, (b) unskilled teachers, and (c) the teaching approach used by the staffers.

V

THEORETICAL FRAMEWORK

Since the beginning stages of this work, it was thought, that the Faculty of Engineering and Architecture would have documents about the teaching of English. Information such as the date of incorporation to the curricula and its reasons, objectives of the English courses and their relationship with the other subjects taught there. However, teachers and authorities of the faculty explained that all the records had been lost during the military occupation.

Thus, there are no records relative to English teaching at the Electrical Engineering School. Therefore, a full account of its beginnings and the reasons why the planners included English in the study plan can not be written. Nevertheless, some teachers consulted said that English had always been a real need in the major, and that it will continue to grow more and more necessary because most up-to-date technical bibliography is published in English.

According to some professors interviewed in the School of Electrical Engineering, English courses have been required since the origins of the major. They said that English was already taught when the major was called Electro-mechanical Engineering, because the planners

thought it was necessary for the students to be able to deal with technical literature written in English.

Records in the Foreign Languages Departments of the University of El Salvador show that before 1986, this department used to teach English service courses in the School of Electrical Engineering. After that year, the Language Department experienced both an increase in student population and teachers' resignation and could no longer provide its services to students other than those of the Faculty of Sciences and Humanities. The School of Electrical Engineering then had to hire its own English teaching staff. This fact impaired even more the already inadequate English teaching in the school.

Most of the teachers hired by the school have not either the knowledge or the experience in teaching technical English. This fact is attested to by the manner in which they approach the teaching process. The class sessions are characterized by excessive translation, writing, oral practice and almost non- existent reading and group discussion.3/ There is question in the researchers' minds about the appropriateness of that methodology.

For the last forty years, the Structural School's insistence on the acquisition of the four known skills in

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3/ See Table XIX

a rigid sequence has been repeated so often that in many teaching circles it has become an article of faith. A student must learn to listen first, then to speak, next to read and finally to write. 4/ However, that can not be the case for Electrical Engineering students, because in their major's curriculum there is no room for more than one English course. They need to acquire a skill that is the most appropriate and achievable for nonnative English-speaking university students. 5/ This skill is reading. By possessing such a tool, the students are able to make contact with the thought and work of experts in related fields through the literature that best serves their purpose.

To provide students with that skill is not as hard as to teach the four skills simultaneously; yet, it is not as easy as it might seem at first sight. One obstacle that hinders the students' access to reading is the concept itself which varies from one person to another. Reading is often interpreted as the simple process of pronouncing the words in a passage or a book. Just try to remember the way your English teacher addressed you in a class. In a typical English class, the teacher would say: "Mr. Pérez, please read from the tenth line on." What this teacher actually

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4/ William E. Norris, "Advanced Reading:Goals, Techniques," English Teaching Forum, (Special Issue, 1975), 201

5/ Fraida Dubin, "What Every EFL Teacher Should Know About Reading," English Teaching Forum, XX, (1982), 14.

expects his students to do is to pronounce the words so that he can check pronunciation and intonation. The student is aware of the fact and concentrates his efforts in pronouncing the words correctly; not in grasping the ideas in the text. Clearly that is not reading. Furthermore, in these quite frequent cases, the concept of reading held by the teacher deprives the students of a chance for acquiring a tool which they would probably be able to use throughout their lives. Since he emphasizes phonetic aspects of language instead of the semantic content of the passage. Activities of this type miscarry all attempt to teach English reading.

Yuko Kobayashi defines reading by saying that:

> Reading is not a simple mechanical skill...It can be an exciting avenue of communication and learning. Reading in our languages brings new knowledge, information, aesthetic pleasure, or just fun. Reading is a means to an end; never an end in itself. 6/

To read it is necessary to have a purpose. Some people read for the sake of pleasure-for example, the reading of detective stories such as those found in Sherlock Holmes, newspapers and comics. However, the majority of university students read non-fiction for neces-

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6/ Yuko Kobayashi, "A New Look at Reading in College Program," English Teaching Forum, (Special Issue, 1975),89.

sity. Very often, for example, they are asked to prepare reports or research papers based on the literature they have consulted. In so doing, they go to libraries to borrow, or go to bookstores to buy those they think are available and will serve their interests; finding, as a result, that a great deal of the literature to be read is in English.

In order to obtain information, university students attempt to read books in English, and struggle to make sense of sentences and paragraphs by putting together the meaning of each individual word. This method not only demands a great deal of time and effort, but also produces frustration, since students, after their labor, realize they have failed to obtain the needed information. At the end of the task, the students have not only become bored but they have also lost the general meaning of the sentence or paragraph. 7/ Apparently, the students think they are reading when they do that; however, actual reading has not ocurred. Reading is more than looking up unknown words is a dictionary, or finding their equivalents in the native language.

"Reading is a complex process related to meaning,in which both author and reader are engaged in a long-dis-

7/ Ibid, p. 190

tance discussion, where the writer encodes ideas, and the reader decodes the written words to thought." 8/ That means, then, that reading is nothing more than a thought-getting process in which the students must follow the author's thinking idea by idea. 9/ According to Janina Lutoslawska, 10/ there is no concern about sound in scientific English, since meaning conveys all relevance.

Ignoring all those opinions, many of the teachers involved in the teaching of English as a foreign language do not even consider the idea that reading can be learned without having first learned to speak the target language. They base their arguments on the structural description of language acquisition. 11/ They forget that university students are not children. They should remember that they have already learned to read in their native tongue. These teachers also overlook the fact that these students do not have the time necessary to learn the four skills. What students, in this situation, need most is to learn to decode the technical and scientific messages found in books or periodicals in a reasonable amount of time. In a non-En-

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8/ Fraida Dubin, Op. Cit., p. 15

9/ Eleonor Wall Thonis, Teaching Reading to Non-English Speakers, London: Collier-Macmilland Ltd., 1970, p.110.

10/ Janina Lutslawska, "Reading Technical English," English Teaching Forum (Special Issue, 1975), p. 248.

11/ Ibid.

glish speaking country like ours, to learn the four skills, students need about five or six-years. What is more, the information needed by them is not usually found through spoken sources.

Written and spoken languages are far from being the same thing. A printed text is more than an imperfect representation of speech. Written language is more precise; it uses a lot of clauses; and sentences are more complete. Spoken language is more redundant; the speaker corrects himself very often, and less clauses are used. There are a lot of incomplete sentences. The speaker also uses a lot of pet phrases such as I MEAN, UH, WELL, and so forth.

C.W. Kreidler acknowledges the existence of such differences when he states that stress and intonation are represented, in written language, in the most elementary way, 12/ whereas in spoken language those components are as important to convey meaning as vocabulary or grammatical patterns are.

Thus the learning problem caused by English spelling, in which a given grapheme can represent different sounds, and the same phoneme can be represented by different graphemes, can be avoided by concentrating on semantical content only.

12/ C.W. Kreidler, "Reading as Skill, Structure and Communication," English Teaching Forum, (Special Issue, 1975), 178.

In addition to the facts mentioned above, it is well known that most adult learners find it easier to read a new language than to speak it. 13/ Therefore, it is necessary to take advantage of this reality in the University of El Salvador, where most of the students are adults.

Many schools of the University of El Salvador include English as a subject matter in their respective curricula. The allotment of time for it varies in the different schools: some ask for one term only; others ask for two or more semesters, but in none of them more than two years are asked for, except for the Language Department the main task of which is the teaching of English as a second language.

Unfortunately, the sole inclusion of that language as a mandatory subject within the students' study plans does not solve the problem of their incapacity to read the necessary literature written in English. The sad truth is that the students do not learn enough in the service English courses to read the reference bibliography. It is necessary to spot and eliminate the set of circunstances that foil their efforts when they try to read. A good beginning is offered by the theory presented by Mr. Tito Villa Villegas. He says that when someone reads something with understanding,

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13/ Eskey, Loc. Cit.

that is intellective reading, be it in his native or second language. According to him, this phenomenon is carried out by the learner by means of three processes occuring simultaneously. 14/ (1) The Selection process. Here, the reader picks out a few words from the whole bunch in the passage, as the main bearers of the writer's intended meaning. (2) The Classification process. Through it, the reader discovers the relationships among the previously selected meaningful words. (3) The Specification Process. During this stage, the one who reads relates the meaning found in the other two processes with the real world around him. By so doing, the reader completes his understanding of the text read. This means that the whole message or meaning is not only in the text being read, but also in the mind of the reader. That is to say that reading is a process in which the meaning is produced by the interaction of the text and the reader. Sandra Silverstein Calls the information found in the text "bottom-up" or "text-based processing," and what the reader brings in from his own background "top-down" or "Knowledge based information." 15/

Mr. Villa refers to the same thing when he speaks

14/Tito V. Villegas, "Three Useful Processes in the Teaching of English Reading." English Teaching Forum, XVI (1978), p. 30.

15/ Sandra Silverstein, "Twenty-five years of Teaching Listening Comprehension," English Teaching Forum, XXV (1987), p. 11.

of "intrinsic" information (the text); and "extrinsic" information, the relationship of textual information with the real world of the reader. 16/

If the above viewpoints are taken as being an adequate analysis of the reading process, it becomes necessary to teach students to identify the most meaningful words. That is, the students must be taught to find verbs, nouns, adjectives, connectors and adverbs. They also have to be taught to identify the relationship of those words within the paragraph, since this is the unit of thought.

It must be understood once and for all that in order to think of a person as a good reader, it is not necessary for him or her to pronounce English accurately. Neither is it indispensable, though it would be better, to know the meaning of all the words contained in a passage. Nor is it sufficient to use the best English-Spanish dictionary. Instead, it is important that such reader be able to properly grasp the author's ideas expressed in the text. The person who reads has to find in the written matter some sort of reflection of the real world he knows, so that he can relate one to the other-the new knowledge expressed in the text versus what he already knows.

This can be demonstrated when students summarize a

16/ Villa Villegas, loc., cit.

passage previously read in their own words. Or when they answer questions in detail about the passage in their native language. Since, after all, they are not compelled to speak English, but to demonstrate their understanding.

The School of Electrical Engineering urgently needs to put these theories and experiences into practice. Engineering students must be able to read texts in English to obtain the information printed in that language and to begin applying such information for the benefit of our country.

It is a known fact that most of the major technological advances are reported in English. Some people go as far as to say that understanding English is the key to most of the world's scientific knowledge. For example, if a non-English speaking scientist discovers or invents something, such discovery or invention is eventually reported in English. Japan announces its products in English, Italy does the same too. Even El Salvador uses English to identify its products. One has just to look at the motto printed in Salvadorean products: "Made in El Salvador."

Most upper-level students majoring in Electrical Engineering declare that they need to read books in English, likewise, most of them complain that they have not learned to

cope with the materials printed in English. 17/ Solving this problem is a challenge for the university in general and for the School of Electrical Engineering in particular. Before this school attempts to do something to bridge the gap between the students' inability to read and the English sources of information (books, periodicals, magazines, etc.), a diagnosis has to be made. This instrument should reveal the students' specific needs, their English background as they start the university, their interest toward the subject matter, the most common structures to be encountered in the technical language, and the type of vocabulary that will prevail in the information sources.

The diagnosis is a mandatory starting point. A problem which is not well known cannot be solved. Therefore, it is necessary to study all the details related to the English reading problem faced by the students of Electrical Engineering in the Faculty of Engineering and Architecture of the University of El Salvador.

17/ Both authors taught English at the School of Electrical Engineering in 1986. Moreover, one of them is a technician whose High School classmates are now approaching graduation or are upper-level students. These students have voiced such complaints.

VI

METHODOLOGY OF INVESTIGATION

Type of Research

The present research is descriptive, based on direct observation and supported by theories found in bibliographical sources. It not only describes the phenomenon under study but also analizes, explains and makes inferences about it. This work is not a solution in itself; however, it represents an abligatory first step towards any possible solution.

Populations

Three populations have been taken into consideration. Each of them provided particular information which was used to structure the diagnosis presented in this work.

A) Students of Electrical Engineering

These are the students who were taking English I during the first term, 1987-1988.

There were about 250 students of either sex. The students belonged to diferent levels and majors, from the first to last year and from all the majors taught in the Faculty of Engineering and Architecture, except for Civil

Engineering. Due to absenteeism, only 186 of these students could be reached. Even so, the number was considered too big to be practical and a sample had to be selected. The sample was obtained through the following formula:

$$n = \frac{Z^2 \times p \times Q \times N}{(N-1) \times E^2 + 2^2 \times P \times Q}$$

Where: n = sample to be determined

N = working universe (186 students)

Z = Critical value corresponding to a certain confidence coefficient

P = Probability of selecting students of Electrical Engineering

Q = Probability of not selecting students of Electrical Engineering

Restrictions for calculating "n": $p = 0.5$

$Q = 0.5$

$E = 0.10$

Substituting, it is found that:

$$n = \frac{(1.96)^2 \times 0.05 \times 0.5 \times 186}{(186-1) \times (1.10)^2 + (1.96)^2 \times 0.5 \times 0.5}$$

$$n = \frac{178.63444}{2.81}$$

$$n = 63$$

As shown above, the formula employed produced a sample which consisted of sixty-three students. To draw those sixty-three students from the working universe (186), simple randomness was applied by means of a table of random numbers.

B) Teaching staff

This population was constituted by the professors teaching technical subjets in the School of Electrical Engineering. It had been established that the complete universe was going to be studied, but, unfortunately, only five professors out of twenty could be reached. By coincidence, these professors taught high level subjects, a fact which was helpful for the research.

C) Heads of Departments

In the School of Electrical Engineering, there are two departments: The Power Department and The Electronics Department. All the universe was taken into account for this research because it consisted of just two people. The director of the School could not be interviewed, because by that time he was out of the country.

Techniques, Instruments and Procedures

To collect the data analyzed in this work, four tech-

niques have been used: interviews, questionnaires, and direct observation.

1) Two types of interview guides were prepared. The first one consisted of nine open questions. By means of these, it was possible to clarify aspects such as the importance of English in the major of Electrical Engineering, the attitude of authorities toward English, the objectives the English course aimed at, and the skills the students needed most.

This guide was used to interview the heads of the two departments of the School of Electrical Engineering. The authorities were asked the questions and they could answer freely. The interview was recorded on tape, and lasted from fifteen to twenty minutes.

The second interview guide was composed of twelve structured questions. There were questions about the importance of English in Electrical Engineering, the best time to teach it within the curriculum, the proportion of bibliography found in English, learning problems, the English programs and their objectives, the number of class hours that should be alloted to English, and the English skill students needed most. This instrument was used to interview the professors teaching technical subjects in the School of Electrical Engineering. The questions of

this guide were asked to five professors of high-level subjects. The interviewers taped their answers in cassettes for later analysis. 18/

2) A questionnaire was elaborated. It contained eleven closed questions about the importance of English for Electrical Engineering students, students' interest in English, students' expectations concerning English I, and the ability students preferred to learn. All the questions were prepared so that the individuals only had to select the answer they thought best by jotting down an "x" or any other mark. These instruments were given to the students of Electrical Engineering taking English I. Before finishing an ordinary class, students were requested to answer the questionnaire, and they were given about fifteen minutes to fill it in.

3) A Thirty-item test was prepared. It was divided into two parts. The first part, which consisted of 25 items, included essentials of English grammar. For example, the verb Be, the verb Have, agreement of subject and verb form in a sentence, interrogative sentences, negative statements, adjectives, adverbs and connectors. The second part consisted of a 150 - word technical reading. From

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18/ See Tables XXII-XXXV

this reading, five questions were drawn to test its comprehension. Once again, there were four choices: one correct option and three distractors,so that students could select the best one. If students answered four or five questions correctly, their comprehension was considered acceptable. But if they answered less than four questions correctly, it was an indication of insufficient comprehension.

In an ordinary English class period at the School of Electrical Engoneering, the teacher asked the students to solve the exam described above. They were instructed to not write their names on the paper. That encouraged students to work individually. In about twenty minutes, the students had already finished the test. The purpose of this test was to find out Electrical Engineering students' knowledge of English grammar, as well as their capacity to comprehensively read written English.

4) An observation guide was prepared to observe English class in the School of Electrical Engineering. This instrument contained three parts: Methodology used by the teacher, activities done by the teacher in class, and students' behavior during English classes. The observers visited the groups five times. There were five groups to be observed. The observation days provided the researchers with information about the frequency with which teachers

and students arrived at class. The observations were carried out during both morning and afternoon shifts. There were only five instructors teaching English at the school of Electrical Engineering during term I, 1987-1988, and all of them were observed. These people were heterogeneous as to mejor and level. Two of them were undergraduates of "Licenciatura en Idiomas." Of the other three, one had a Chemistry B.S. and the other two teachers had already finished the three-year program for English teachers in the Foreign Languages Department. Three out of the five teachers had had some experience in teaching English as an second language, one of them was just beginning to teach English, and the other one had experience in teaching subjects related to Chemical Engineering, but not English.

5) A form was prepared to collect technical bibliography written in English. 19/ The form was given to the professors of technical subjects so that they were able to fill it in. This instrument had blanks for the name of the professor, names of the subjects and titles of the textbooks used. Space for the name of the author was also included.

Altogether, information for the diagnosis was collected regarding background and attitudes of students; opinions of professors, methodology used to teach En-

19/ See Table XXXVI

glish, type of English used in Electrical Engineering textbooks, and the structures commonly found in technical Electrical Engineering books.

After the data were collected, they were processed, analyzed, and inferences were drawn.

Definition of Terms

The following terms are very much used in this research. Their definitions are presented here in order to clarify and justify their appearance. Even though these words might have other meanings, only the meanings that concern this work are presented. The terms are not in alphabetical order.

Skills: the abilities concerning language learning a person may develop, e.g. speaking, listening, reading and writing.

English background: the English knowledge brought by the student to the course of English he may be taking.

Technical English: the English related to a particular branch of human knowledge. In this case, the English related to Electrical Engineering.

Technical books: the books related to Electrical Engineering.

Diagnosis: the identification of the needs and interest of the students concerning English. Also the identification of the type of language skills to be taught.

Native speaker: someone who speaks a language, in this case English, as his first language.

non-native speakers: the people whose first language is not English. Salvadorans are non-native speakers of English.

Reading: an intellective process in which the reader has a kind of communication with the author of a book.

Phonetics: the branch of linguistics which deals with the sounds of a language, their production, combinations and representation by written symbols.

Semantics: the study of meaning of words in a language.

Scientific English: a special type of English which is simple, regular, accurate and concise.

T.E.F.L.: the teaching of English as a foreign language.

T.E.S.L.: the teaching of English as a second language.

Target language: the language to be learned. In this case, English is the target language.

Grapheme: a letter of an alphabet. The sum of letter combinations that represent a single phoneme.

Phoneme: any sound of a language. The smallest unit of speech that distinguishes one word from another.

Intellective reading: the act of reading something with understanding.

Translation: in the present work, the following items are called translations: books, articles, newspapers, handouts, periodicals, etc. They were originally issued in English; later on, they were translated

into Spanish.

Program: the instrument that contains all the material to be taught in a given English course.

It also includes the methodology to be used or followed by the teacher.

Translation method: a method used to teach a foreign language by comparing the target language with the native language.

Lexical characteristics: the words or the vocabulary of a language.

Structural characteristic: the grammatical structures or patterns of a given language.

Descriptive work: a research designed to obtain a precise, panoramic view of the situation; to establish a hierarchy of the problems, to discover criteria policies or strategies; to detect variables and their relationships; and to design guidelines for the test of the hypotheses. 20/

Structural School: a body of scholarly people whose methods, concerning language teaching, were based on Bloomsfield's Structural Linguistics. These persons paid more attention to the form of a language than to its meaning.

20/ Raúl Rojas Soriano. Guía para Realizar Investigaciones en Ciencias Sociales. 21est ed. México Universidad Nacional Autónoma, 1982. p. 31

Atomization: metaphorical term used to describe the extremely departmentalized condition existing in the University of El Salvador, where each school or department works on "its own thing," ignoring the work done by the others.

VII

ANALYSIS AND INTERPRETATION OF DATA

A. Analysis of Data

The data collected for this research were analyzed and presented by means of tables and graphs. Following the analysis, the interpretation of data is separately presented. Finally, the directional hypothesis is tested.

Question 1: When you took English for the first time, were you interested in learning it?

TABLE I

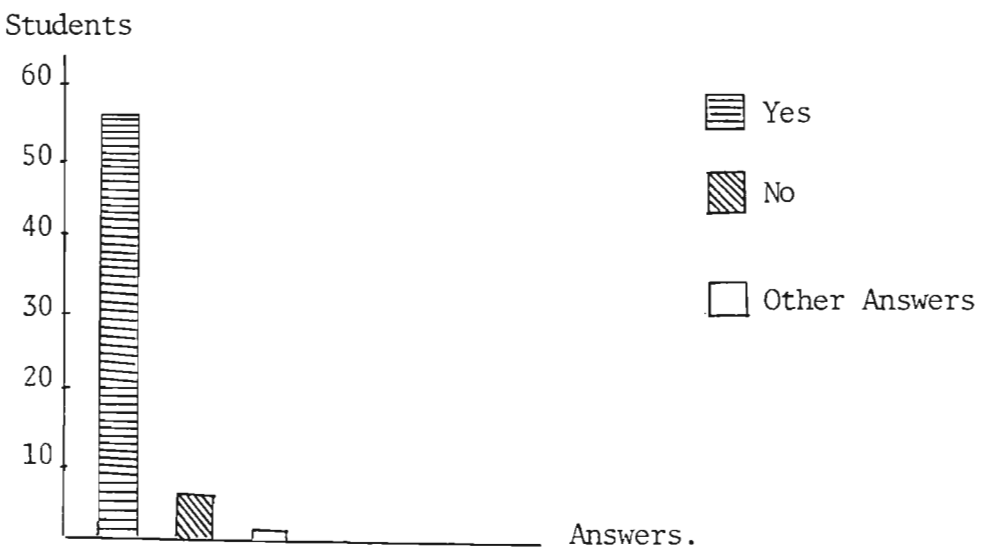
Previous Interest in English

ANSWERS	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Yes	56	88.88 %
No	6	9.52 %
Not Sure	0	0.00 %
Other Answers	1	1.58 %
TOTAL	63	100.00 %

The great majority of students (88.88%) said that they had been interested in English. A few students, six out of 63, expressed the opinion that they had never cared for English.

GRAPH 1

Previous Interest in English



Question 2: If your answer to the previous question was affirmative, do you still feel the same interest?

TABLE II

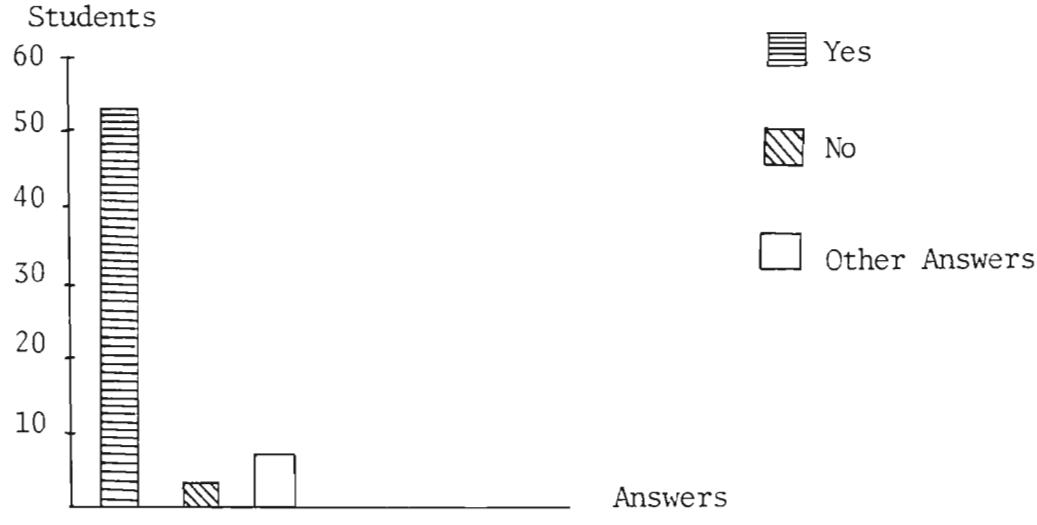
Present Interest in English

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Yes	53	84.12 %
No	3	4.76 %
Other Answer	7	11.11 %
TOTAL	63	100.00 %

A continuing strong majority declared that they still felt the same interest as they had in their first encounter with the English Language. Three students out of the sixty-three expressed that they felt a continuing reluctance towards English. Seven people said other things, for example, that they had been interested at the beginning, but that little by little they had lost their interest toward English.Graph 2 shows the information provided by question 2.

GRAPH 2

Present Interest in English



Question 3: Have you taken other English courses besides those required in "Tercer Ciclo" and "Bachillerato"?

TABLE III

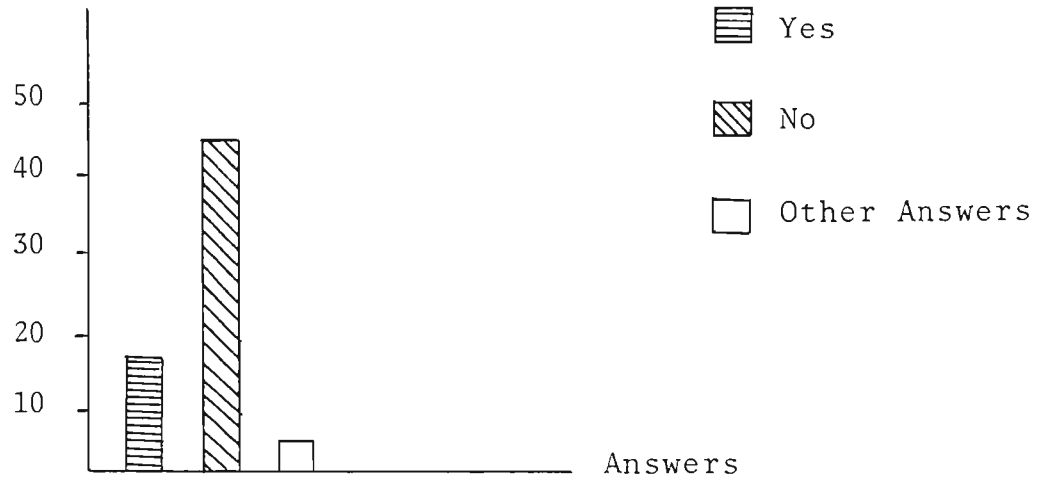
Additional Courses

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Yes	15	23.80 %
No	44	69.84 %
Other Answers	4	6.35 %
TOTAL	63	100.00 %

A minority of students (23.8%) have taken additional courses in English. The majority of students, or the 69.84 %, have not had the opportunity to take an English course besides the required one. Below, there is a graph showing the same results.

GRAPH 3

Additional Curses



Question 4: What skill would you like to acquire?

TABLE IV

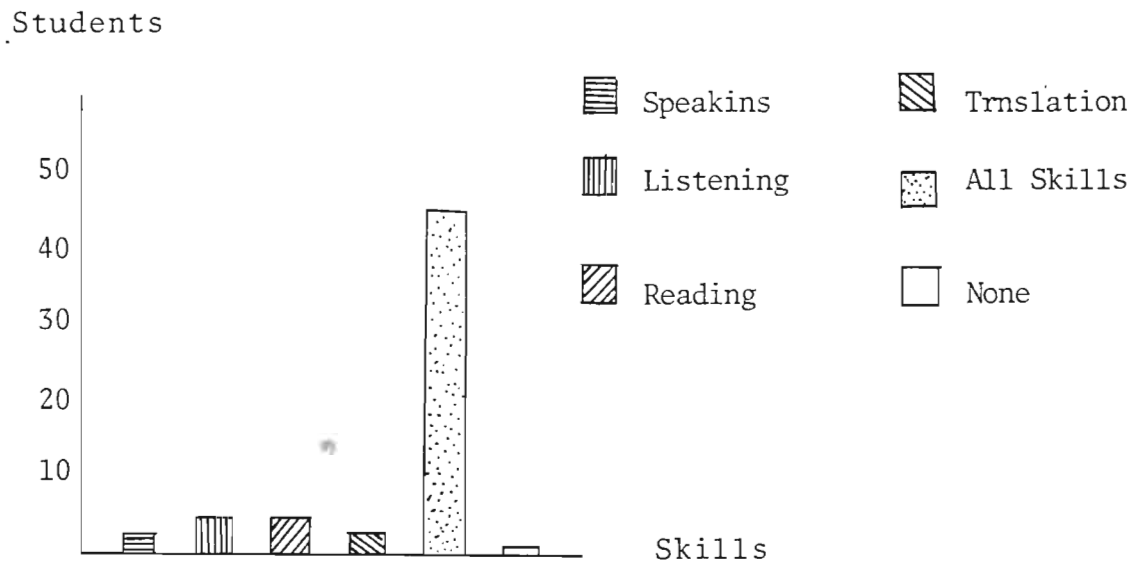
Choice of Skills Desired

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Speaking	3	4.76 %
Listening	5	7.93 %
Reading	5	7.93 %
Writing	0	0.00 %
Translation	3	4.76 %
All the skills	46	73.01 %
None	1	1.58 %
TOTAL	63	100.00 %

The great majority of students, 73.01%, expressed that they wanted to acquire all the skills mentioned in the questionnaire. Only five people, 7.93 %, said that they wanted to read English. Three students out of the sixty-three, or 4.76%, wanted only to speak English. Only three students wanted to understand spoken English. Graph 4 shows the same results.

GRAPH 4

Choice of Skills Desired



Question 5: How much English do you know?

TABLE V

Knowledge of English

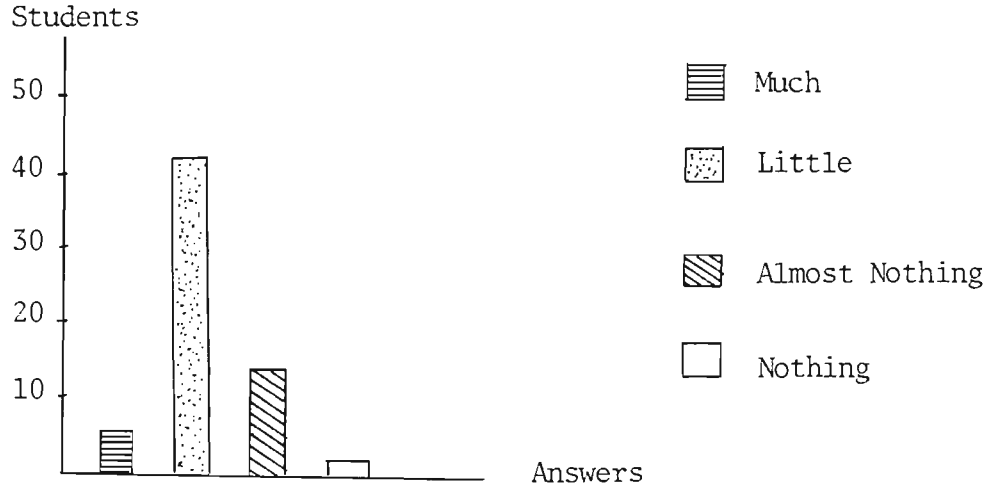
ANSWERS	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Much	6	9.52 %
Little	42	66.66 %
Almost Nothing	14	22.22 %
Nothing	1	1.58 %
TOTAL	63	100.00 %

Forty-two students out of the sixty-three, or 66.66% of the sample, said that they knew little English. Only six people said they had a solid knowledge of English.

Fourteen students placed themselves in the category of knowing almost nothing and only one student said that he did not know anything whatsoever of English. The same results are presented graphically below.

GRAPH 5

Knowledge of English



Question 6: What had been your English grade before coming to the university?

TABLE VI

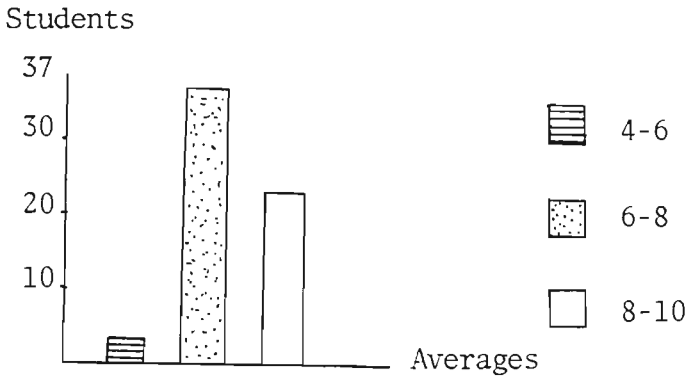
Grade Averages in High School English Courses

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
4-6	3	4.76 %
6-8	37	58.73 %
8-10	23	36.5 %
Other Grades	0	0.00 %
TOTAL	63	100.00 %

The majority of the students or 37 of the 63 questioned, said their English grades had been fairly good, a grade average of 6-8; moreover, twenty three students, representing 36.5%, answered that they had had a grade average of 8-10. Only three students said their grades had been bad. Graph 6 shows the same results.

GRAPH 6

Students' Grade Averages in High School English Courses



Question 7: Do you think that English is important for your major?

TABLE VII

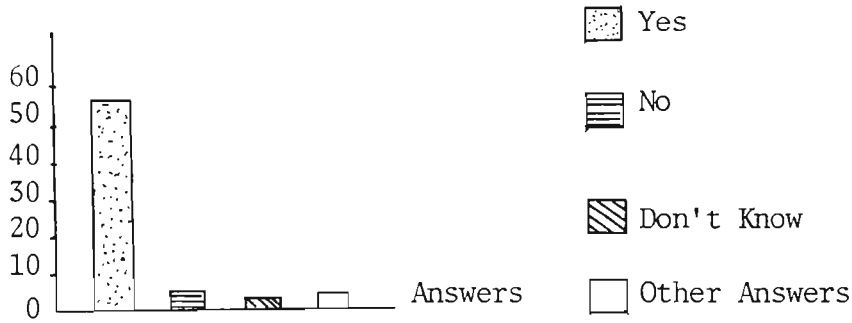
Opinions on Importance of English in Electrical Engeneering

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
yes	56	88.88 %
No	3	4.76 %
Don't Know	2	3.17 %
Other answers	2	3.17 %
TOTAL	63	100.00 %

A strong majority of students in the sample thought that English was important in Electrical Engineering; only a few students, three out of sixty-three, said that English was not important for Electrical Engineering. Two people were not sure about the importance of English, and two students gave answers not related to the question. See the same results in the graph below.

GRAPH 7

Opinions on Importance of English in Electrical Engineering



Question 8: Based on the English courses you have taken so far, do you think you can effectively read text-books in English?

TABLE VIII

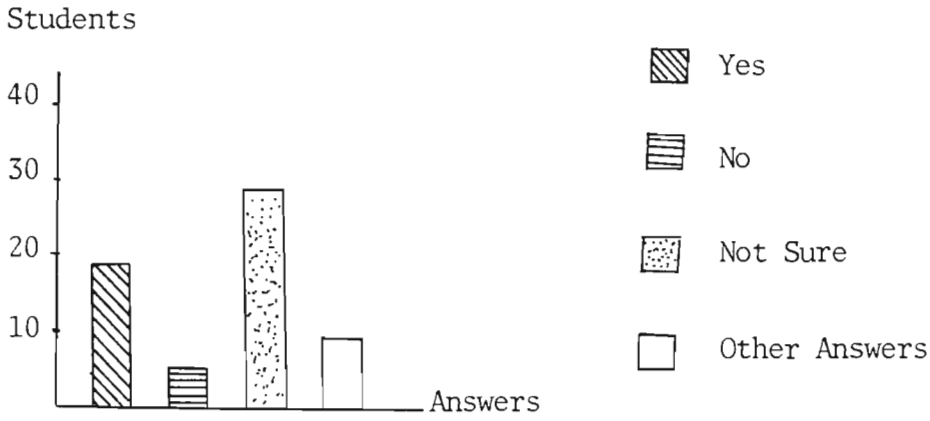
Students' Estimation of Their Capacity to Read English

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Yes	19	30.15 %
No	5	7.93 %
Not Sure	29	46.03 %
Other Answers	10	15.87 %
TOTAL	63	100.00 %

Almost half of the students, 46.03%, did not know if they could read or not; however, nineteen students or about 30%, said that they were able to read. Only five students expressed themselves as unable to read texts in English. Ten people out of the sixty-three stated other things-for example, that they could read easy passages, that they could read non-technical English. etc.

GRAPH 8

Students' Estimation of Their Capacity to Read English



Question 9: What do you think you will learn from the English I course?

TABLE IX

Students' Expectations From the English I Course

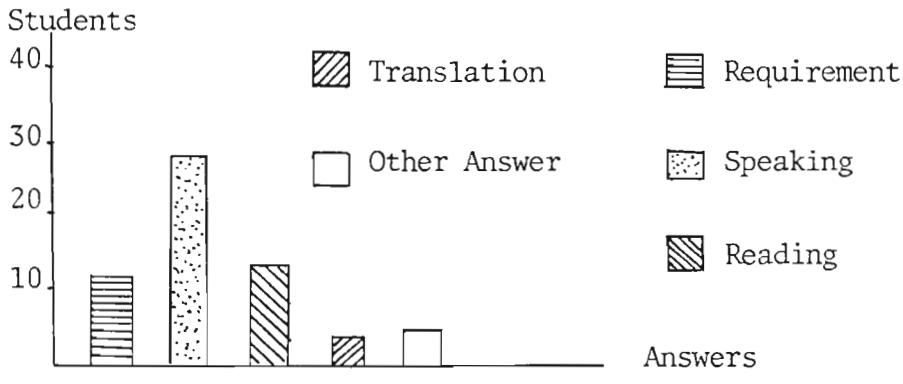
ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Requirement	12	19.04 %
Speaking	4	6.34 %
Reading	14	22.22 %
Translation	28	44.44 %
Writing	0	0.00 %
Other Answers	5	7.93 %
TOTAL	63	100.00 %

Twenty-eight out of sixty-three or 44.44%, students thought that translation was the main objective of English I course.

However, 22.22% of the students hoped to be able to read after taking English I. Twelve Students thought that English I was just a requirement to be fulfilled. Few students expected to speak English after taking English I.

GRAPH 9

Students' Expectations From English I



Question 10: Would you be interested in taking a technical English course related to Electrical Engineering?

TABLE X

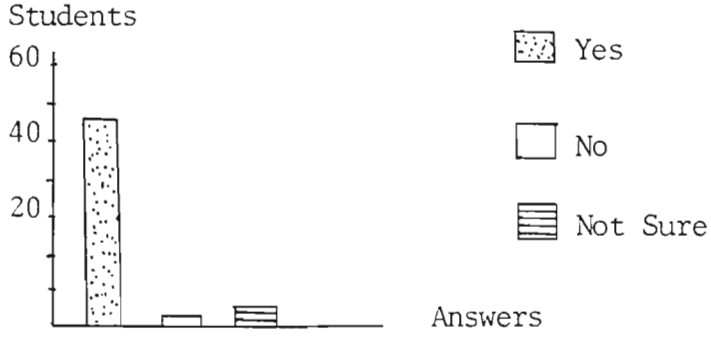
Students' Interest in a Technical English Course

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Yes	56	88.88 %
No	2	3.17 %
Not sure	5	7.93 %
TOTAL	63	100.00 %

The vast majority of the students, 88.88 %, was pleased with the idea of taking a technical English course. Only two students were not interested in technical English related to Electrical Engineering, and five others were "not sure."

GRAPH 10

Students' Interest in a Technical English Course



Question 11: Why do you think the University has included an English course in the Electrical Engineering Syllabus?

TABLE XI

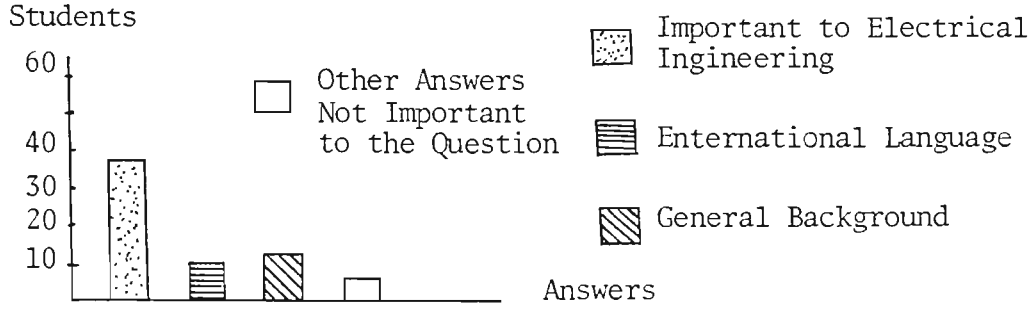
Students' Assessment of the Purpose of the English Course

ANSWER	NUMBER OF STUDENTS	SAMPLE PERCENTAGE
Important to your major	36	57.14%
N.A. Influence	0	0.00%
Intern. Language	10	15.87%
Gral.Knowledge	12	19.04%
Other Answers	5	7.93%
TOTAL	63	100.00%

More than half of the students, 57.14%, thought that English was important for Electrical Engineering. Twelve students considered English important just as a part of a general academic background; and ten students said that English was important as an international language.

GRAPH 11

Students' Assessment of the English Course



ANALYSIS OF THE RESULTS OF THE DIAGNOSIS-EXAMINATION GIVEN TO 63 STUDENTS OF THE SCHOOL OF ELECTRICAL ENGINEERING TO EVALUATE THEIR GENERAL KNOWLEDGE OF ENGLISH.

TABLE XII

Students' Knowledge of Elementary English Grammar

CORRECT ANSWERS	NUMBER OF STUDENTS	PERCENTAGE
0-5	15	23.80 %
6-10	33	52.38 %
11-15	13	20.63 %
16-20	1	1.59 %
21-25	1	1.59 %
TOTAL	63	100.00 %

Table XII shows that forty-eight students gave ten or less correct answers out of twenty-five. That number represents over 76% of the sample. Thirteen students, representing 20%, answered half of the items correctly; and only two students, representing 3.18%, answered more than half correctly.

Next, the same results are presented by means of a graph so that such students' uneven achievement concerning English grammar can be more easily noticed.

GRAPH 12

Students' Knowledge of Elementary English Grammar

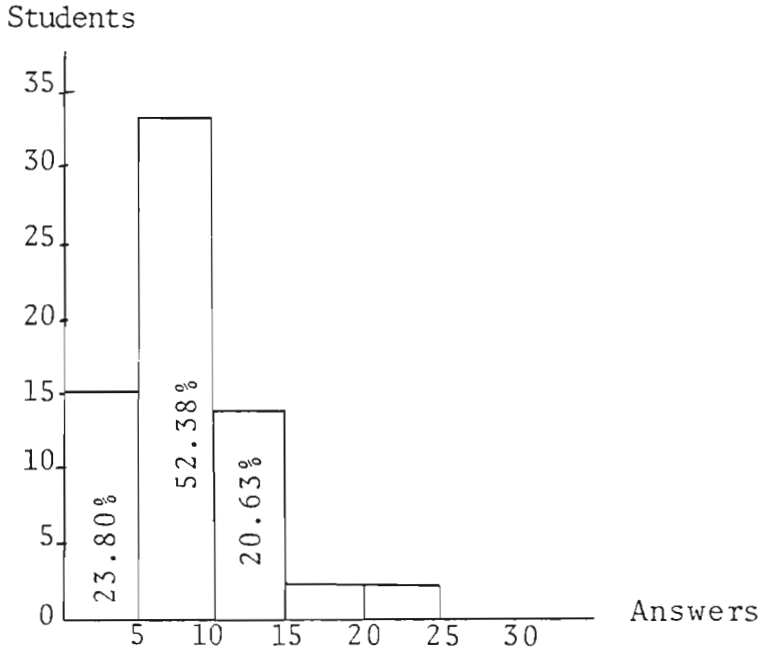


TABLE XIII

Students' Comprehension of a Short Technical English Reading

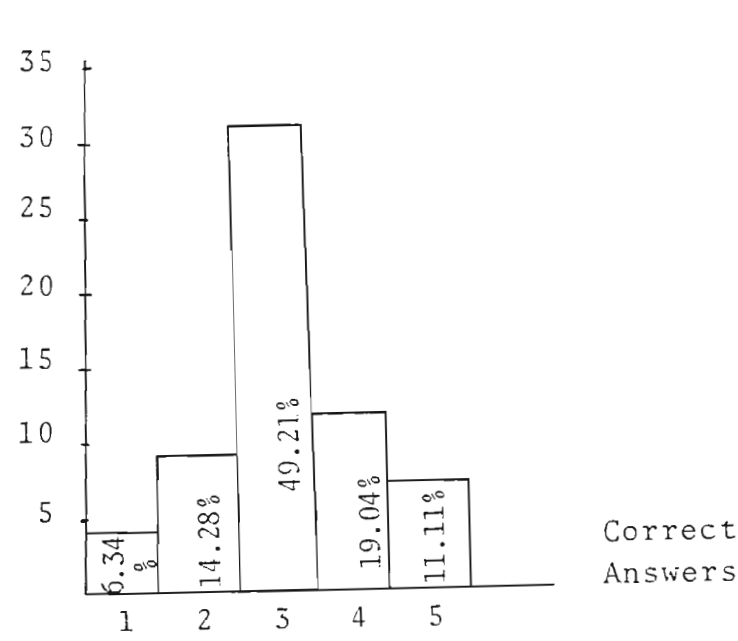
QUESTIONS CORRECTLY ANSWERED	NUMBER OF STUDENTS	PERCENTAGES OF STUDENTS IN THE WHOLE SAMPLE
0	0	0.00 %
1	4	6.35 %
2	9	14.28 %
3	31	49.21 %
4	12	19.04 %
5	7	11.11 %
TOTAL	63	100.00 %

Table XIII demonstrates that only seven students, making up 11.11 % of the sample, answered all five questions correctly. Twelve, or 19.05%, answered four; thirty-one, or about half of the students, answered three out of the five questions; nine, or 14.28% of the whole sample, answered two. Finally, four students, comprising 6.35% of the sample, could answer just one question.

On the following page, a graph appears illustrating these results.

GRAPH 13

Students' Comprehension of a Short Technical English Reading



MOST FREQUENT GRAMMATICAL STRUCTURES OF SCIENTIFIC ENGLISH FOUND IN TEXT BOOKS OF ELECTRIAL ENGINEERING.

TABLE XIV

Structures In Book # 1

Name of the subject: Electrónica I

Subject text book: Microelectronics

Author: Jacob Millman

	Structures	Frequency of appearances
1	Passive voice	57
2	Function shift	10
3	Present participle	20
4	Special compounds	17
5	Abbreviations	17
6	Special plurals	1
7	Affixation	15
8	False cognates	3
9	Different-meaning words	11
10	Present tense	29

Table XIV shows how frequently some grammatical structures crop up in scientific books. In ten pages of a technical book the Passive Voice was found fifty-seven times. The Present Tense appeared twenty-nine times, and the Present Participle, in different functions, was found twenty times. Compounds and Abbreviations were found seventeen times. Fifteen cases of Affixation appeared while there

were ten cases of Function Shift . Words which have more than one meaning cropped up eleven times. Finally, Special Plurals and False Cognates were two cases of low-frequency structures, since they appeared only once and three times respectively.

TABLE XV

Structures in Book # 2

Name of the subject: Lineas de Transmisión

Text book: Transmission Lines and Filter Networks

Author: John J. Karakash

	Structures	Frequency of appearances
1	Passive voice	45
2	Function shift	20
3	Present participle	57
4	Special compounds	7
5	Abbreviations	5
6	Special plurals	2
7	Affixation	16
8	False cognates	2
9	Different meaning words	10
10	Present tense	40

Table XV shows the times the above-listed structures appeared in ten pages of the book Transmission Lines and Filter Networks. The Passive Voice was found forty-five times. The Present Tense was found forty times, and the Present Participle, fifty-seven times. Sixteen words built

by affixation were found. Special Plurals and False cognates appeared twice. There were twenty cases of Function Shift. Cases of words which express different meanings were encountered ten times. Lastly, there were five cases of Abbreviation, and seven of Special Compounds.

TABLE XVI

Structures in Book # 3

Name of the subject: Diseño de Circuitos Digitales	
Text book: Problems and Solutions in Logic Design	
Author: D. Zissos	
Structures	Frequency of appearances
1 Passive voice	52
2 Function shift	34
3 Present participle	31
4 Special compounds	27
5 Abbreviations	20
6 Special plurals	0
7 Affixation	17
8 False cognates	5
9 Different-meaning words	7
10 Present tense	50

In ten pages of the book Problems and Solutions in Logic Design the Passive Voice was found fifty-two times. The present Tense appeared fifty times, while the Present Participle in different functions was encountered thirty-one times. Twenty-seven cases of Special Compounds appeared in the ten

pages. There were twenty Abbreviations, and seventeen Affixations. Five cases of False Cognates were detected. However, there were no cases of Special Plurals. Function Shift appeared thirty-four times, and there were seven cases of words with different meanings.

TABLE XVII

Structures in Book # 4

Name of the subject: Sistemas de Control Automático		
Tex book: Automatic Control System		
Author: Benjamin Kuo., 1985		
	Structures	Frequency of Appearances
1	Passive voice	82
2	Function shift	51
3	Present participle	56
4	Special compounds	41
5	Abbreviations	11
6	Special plurals	6
7	Affixation	106
8	False cognates	9
9	Different meaning words	34
10	Present tense	68

Table XVII illustrates the frequency with which the ten structures appeared in a small section (ten pages) of the book Automatic Control System. The Passive Voice cropped up eighty-two times; present tense appeared sixty-eight times; Present Participle, in different functions, fifty-six.There

were forty-one cases of Special Compounds, and fifty one of Function Shift. In this same sample, there were a hundred and six cases of Affixation, and thirty-four cases of words with special technical meaning (different-meaning words). False Cognates were found nine times; Abbreviations, eleven times; and Special Plurals only six times.

TABLE XVIII

Structures in Book # 5

Name of the subject: Instrumentación Para la Ingeniería

Text book: Introduction to System Analysis

Author: T.H. Glisson

	Structures	Frequency of Appearances
1	Passive voice	51
2	Function shift	44
3	Present participle	31
4	Special compounds	14
5	Abbreviations	22
6	Special plurals	9
7	Affixation	163
8	False cognates	13
9	Different-meaning words	41
10	Present tense	87

Table XVIII shows, as do the preceding tables, the frequency with which those grammatical structures appeared in the technical English book of Electrical Engineering entitled Introduction to System Analysis.

In this sample, the dominant feature was seen in the one hundred sixty-three words built by affixation. The Passive Voice was found fifty-one times; Present Tense, eighty-seven; and Present Participle, thirty-one. There were fourteen cases of Special Compounds and forty-four of Function Shift. Words that express technical meanings were found forty-one times; there were twenty-two cases of Abbreviations, and thirteen of False Cognates. It is also noted that only nine cases of Special Plurals were found.

TABLE XIX

Summary of Structures

Five subjects of Electrical Engineering: Electrónica I, Líneas de Transmisión, Diseño de Circuitos Digitales, Sistema de Control Automático, e Instrumentación para la Ingeniería.

Structures	Frequency of Appearances
Passive voice	287
Funtion shift	159
Present participle	195
Special compound	106
Abbreviations	75
Special plurals	18
Affixation	317
False cognates	32
Different-meaning words	103
Present tense	274

Table XXIX shows the number of structures found in the five textbooks analyzed. Affixation is what appeared with the most frequency, followed by Passive Voice, and

then the Present Tense. Special Plurals and False Cognates appeared very seldom.

Tables XX through XXIV show the results of direct observations of English classes in the School of Electrical Engineering.

TABLE XX

Methodology in English Classes at the School of Electrical Engineering

Methodology	Much	Little	Nothing	Total of Teachers
Structures	5	0	0	5
Oral practice	1	4	0	5
Reading and Discussion	0	5	0	5
Translation	5	0	0	5
Writing	4	1	0	5

All five teachers presented grammatical structures abundantly. All the teachers used little reading and topic discussion in their classes of English. Translation was used by the whole staff of teachers (5) while writing was widely used by four teachers out of five.

TABLE XXI

Types of Excercises in English Classes at the School of Electrical Engineering

Exercise	Much	Little	Nothing	Total of Teachers
Complementation	1	4	0	5
Reading Aloud	2	2	1	5
Silent Reading	0	3	2	5
Questions/answers	4	1	0	5
Group discussion	0	1	4	5
Oral Repetition	2	3	0	5
Substitution	2	3	0	5
Dictation	0	2	3	5
Dialogs	1	3	1	5

Four teachers out of five used reading aloud; silent reading was used little by three of the teachers, and two of them did not use it at all. Four teachers did not use group discussion; the remaining one used it a little. All the teachers observed used oral repetition in their classes. The five teachers observed used questions and answers and substitution drills. Dictation was used by only two teachers and not frequently.

TABLE XXII

Behavior of English Teachers in the School of Electrical Engineering

Behavior	Always	Usually	Rarely	Never	Total of Teachers
Arrives Puntually	0	4	1	0	5
Ends Class on Time	0	4	1	0	5
Uses Time Efficiently	0	3	2	0	5
Looks Calm and Confident	2	3	0	0	5
Answers in a Friendly manner	4	0	1	0	5
Promotes Students' participation	0	2	3	0	5
Corrects Mistakes	0	3	2	0	5
Shows Aprroval	0	2	2	1	5
Assigns Homeworks	0	3	1	1	5
Explains Clearly	2	2	1	0	5

Most of the teachers, four out of five, arrived punctually, and finished their classes on time. Three teachers used their time efficiently. All the teachers looked calm and confident, and the great majority of teachers answered their students in a friendly manner. All five teachers promoted students' participation. Three teachers usually corrected mistakes; two rarely did. Showing approval was rarely seen among the five teachers. Three teachers usu-

ally assigned homeworks, one of them rarely did, and the other one never did. Only one teacher explained clearly, and only in rare cases.

TABLE XXIII

Behavior of Students of Electrical Engineering Taking English I

Students' Behavior	Most	Many	Few	None	Total of Groups
Attend Regularly	0	3	2	0	5
Arrive Puntually	0	1	4	0	5
Spontaneous participation	0	0	4	1	5
Talk to Classmates	0	2	3	0	5
Deliver Homeworks on Time	0	1	2	2	5
Leave classroom on time	0	2	3	0	5
Sit in back of room	2	2	1	0	5
Take notes	2	3	0	0	5

Most of the students did not attend English classes regularly; this irregular attendance happened in the five groups observed. Only a few students arrived puntually to class in four of the five groups; moreover, in three of the groups some students left the classroom before the class was over. In four of the groups only a few students participated spontaneously. In two of the groups, students

were observed talking among themselves during class. In two groups, a few students delivered assignments on time; and in two other groups, students never delivered homework assignments. In four of the groups, many students preferred back seats.

INTERVIEW WITH THE PROFESSORS OF THE SCHOOL OF ELECTRICAL ENGINEERING

Five professors of the School of Electrical Engineering were interviewed using a structured format, and their answers are shown in the series of tables below. Each table is preceded by a question.

Question # 1. How important is English in this major?

TABLE XXIV

Importance of English

Level of Importance (Answers)	Number of Professors
Unimportant	0
Important	2
Very Important	3
Other Answers	0
TOTAL	5

Two professors out of five answered that English was important in the School of Electrical Engineering. Three answered that it was very important.

Question # 2. What do the students of Electrical Engineering need English for?

TABLE XXV

Uses of English

Uses	Number of Professors
Translation	3
Reading	2
Others	0
TOTAL	5

Three professors out of five said that the main use of English in the School of Electrical Engineering was seen in translation. Two professors answered that reading was more useful in English than other skills.

Question # 3. Which ability is the most useful for students of Electrical Engineering?

TABLE XXVI

The Most Useful Ability

Ability	Number of Professors
Listening	0
Speaking	0
Reading	5
Writing	0
TOTAL	5

All the teachers agreed that the skill the students needed most was reading.

Question # 4. In which level of the major-at the begining, in the middle or at the end- do the students of Electrical Engineering most need to read English textbooks?

TABLE XXVII

The Best Time to Teach English

Level in the major	Number of Professor
At the beginning	0
In the middle	5
At the end	0
Other responses	0
TOTAL	5

All the professors considered that the necessity of reading English textbooks was felt most intensely in the second half of the major of Electrical Engineering.

Question # 5. Is it true that there are subjects in the major whose textbooks are written in English only?

TABLE XXVIII

Textbooks in English Only

Answer	Number of Professors
Yes	5
No	0
TOTAL	5

All the teachers consulted answered that there were many subjects whose textbooks existed only in English.

Question # 6. Does the fact that the bibliography for research is only in English present a problem for the students?

TABLE XXIX

Bibliography in English

Answer	Number of Professors
Yes	5
No	0
Sometimes	0
Other responses	0
TOTAL	5

All the professors interviewed said that the fact that the bibliography was written only in English presented a big problem for the students.

Question # 7. What linguistic characteristic causes the most problems for the students?

TABLE XXX

The Most Problematic Linguistic Characteristic

Linguistic Characteristics	Number of Professors
Grammatical Structures	4
Vocabulary	0
Other characteristics	1
TOTAL	5

Four people out of five answered that grammar was more difficult than vocabulary. One teacher said that both were equally difficult.

Question # 8. Do you think it is difficult to read textbooks written in English?

TABLE XXXI

Difficulty in Reading English

Answer	Number of Professors
Yes	3
No	2
TOTAL	5

Three professors out of five considered English reading difficult. The other two said it was not.

Question # 9 According to your experience, how many semesters of English teaching would be necessary to enable the students to learn to read English?

TABLE XXXII

Time Allotment for English

Answer	Number of professors
One term	2
Two terms	1
Three terms	0
Others	2
TOTAL	5

Two professors out of five said that one term was enough to facilitate English reading competency, but that the type of English to be taught had to be specialized. One of them felt that two terms were necessary. Two teachers said that they did not know how much time was necessary. They said that it depended on the student's previous knowledge of English.

Question # 10. Are you familiar with the programs used to teach English I in this school?

TABLE XXXIII

Acquaintance with English I Programs

Answer	Number of Professors
Yes	0
No	5
TOTAL	5

All professors answered that they did not know the programs used to teach English I in the School.

Question # 11. It is generally agreed that the content of a program should be determined by the real needs of the students; do you think that in the case of English I such a principle has been followed?

TABLE XXIV

The Programs' Relevancy to Students' Real Needs

Answer	Number of professors
Yes	0
No	5
TOTAL	5

All the teachers interviewed said that the contents of the programs of English I that they once took did not meet the needs of the students.

Question # 12. Do you think that the students will be able to learn to read English without having to learn to speak it?

TABLE XXXV

Reading English Without Speaking It

Answer	Number of Professor
Yes	5
No	0
TOTAL	5

All the professors questioned answered that it was possible to learn how to read English without having to learn to speak the language first.

TABLE XXXVI

Summary Table of Textbooks Written Either in English or Spanish and Used in Fifteen Subjects of Electrical Engineering.

Names of the Subjects	Textbooks in English	Textbooks in Spanish	
1 Líneas de Transmisión	3	0	3
2 Sistemas Eléctricos Lineales I	2	1	3
3 Sistemas Elécticos Analógicos	3	0	3
4 Instrumentación para la Ingeniería	2	0	2
5 Sistemas de Control Automático	3	0	3
6 Microprocesadores I	3	0	3
7 Microprocesadores II	3	0	3
8 Diseño de Circuitos Digitales	1	1	2
9 Sistemas Digitales Programables	1	1	2
10 Electrónica I	2	1	3
11 Electrónica II	0	2	2
12 Conversión de Energía Electromecánica I	1	2	3
13 Comunicaciones Eléctricas	1	2	3
14 Teoría Electromagnética	3	0	3
15 Análisis Electrónico Auxiliado por Microcomputadora I	3	0	3
TOTAL of Subjects = 15	TOTAL 31	TOTAL 10	TOTAL 41

The table above comprises 41 books used in fifteen subjects as reported by the Electrical Engineering professors interviewed. Thirty-one books (75.60%) are written in English. Ten books (24.40%) are found in Spanish. The fifteen subjects represent the 31.70% of the major's curriculum (48 subjects).

INTERVIEW WITH THE HEADS OF THE SCHOOL OF ELECTRICAL ENGINEERING

There are two departments in the School of Electrical Engineering: The Power Department and the Electronics Department. The heads of both departments were questioned in the enterviews and their answers were very similar. They are presented below.

Question 1: How important is English for the major of Electrical Engineering?

To the above question both heads answered that English was very important for Electrical Engineering

Question 2: Is English considered as a "filler" in the School of Electrical Engineering?

One of the heads said that it was true that English was considered unimportant by some people in the School. The other one said that, unfortunately, students did not care for English as much as they did for the other subjects, such as Physics and Mathematics, for example.

Question 3: Is there any subject for which all the available textbooks are only in English?

Both heads said that there were subjects with textbooks only in English. One of them added that the few books available in Spanish were translations from the English versions.

Question 4: Do you think that one English course is enough to enable the students of Electrical Engineering to read textbooks in English?

Both of them agreed that one semester of English was not enough. Furthermore, one of them said that he thought that the English course offered to Electrical Engineering students should be technical.

Question 5: Do you think that the programs for English I are adequate?

Both of them said the programs for English I were not adequate.

Question 6: What do you think of a program that is oriented to reading and fulfills the students' needs?

To that question both department heads answered that it would be a great idea to have a program such as that.

Question 7: Judging from your experience, what are

the biggest problems students find when they try to read textbooks in English?

Both authorities agreed that students' English vocabulary was too poor for efficient reading and created the most serious problems.

Question 8: What skill do you think students should develop when they take English?

One of the heads said that translation was the most important skill; the other said that reading was the main skill to be taught to students of Electrical Engineering.

Question 9: Do you think that students can acquire reading ability without having to learn to speak English first?

Both of them answered that it was possible and they added that, as a matter of fact, that was what most of students did: they did not speak a word of English, but were able to read it.

SUMMARY

The heads of the departments of the School of Electrical Engineering are aware of the importance of English in that school. They reaffirm what the professors have declared about the textbooks in English and the existence of subjects for which no textbooks are found in Spanish.

They mention that their own experience shows that a person can learn to read English even if he does not speak it.

These authorities accept the reputation given to English as a space-filling subject; they state that it should not be so; they have not done anything to eliminate such a reputation, however; yet they think that having a specialized course in English reading, based on the real textbooks of Electrical Engineering, is a vital necessity for the students.

B. INTERPRETATION OF DATA

Electrical Engineering Students

The data collected concerning students' attitudes present a contradiction. In the questionnaire, they declared that they were interested in English, and most of them reported having been good English students since the high school days with grade averages of between 6 and 8, or higher.

Moreover, they said they wanted to learn to listen, speak, read and write English. Obviously these people may have more than satisfactory capacity and enough interest to learn English. Yet, observation of their behavior in class negates that interest. They arrive late and sit in the back of the room, occassionally talking among themselves. They do not turn in assignments on time, and they participate in class only if they are pressed by their instructor. To complete the puzzle, nearly half of them, when given a 150-word technical passage to read, tackled it enthusiastically and half-reading, half-guessing, managed to answer more than half of the questions. That performance is not satisfactory in real reading activity; however, it is good enough for beginners, and more than good enough as positive indication on the motivational index.

What can be understood from this mosaic of contradictions? One message seems clear: non-stimulating contents and poor methodology may produce a contradictory behavior of students in their English classes. Those young men and women, who are eager to read technical passages on their own are given in class sets of isolated sentences written on the blackboard and then translated by the teacher himself. Students never do silent reading or group discussion in class. Instead, the teacher reads the sentences aloud and has the students repeat. These students may not know about English teaching methods, and many of them are not even aware of the objectives of the course, but they know whether they are learning or not. The pieces of the puzzle seem to fit into a clearer picture where students feel that time is being wasted in oral repetition of banal sentences. So, precisely because they are good students, they do not care for the English I lessons they receive.

Professors of Electrical Engineering

The professors' interview indicate that they are fully aware of the problem students face; as a matter of fact, they named several subjects for which no books in Spanish can be found. They are also aware of the fact that the English skill the students need most is reading, an that that need is felt most intensely in the second half of their major.

The Engineering professors seem to contradict themselves when they say that students have to read books in English an then add that the main use of English in the Electrical Engineering School is found in translation(see table xxv). But that contradiction may be simply the result of a very common misconception concerning reading. (See Theoretical Framework p. 15). The professors may not realize that reading in English implies understanding, getting information and finding the purpose of the author, just as reading in Spanish does; perhaps, that is why they think that translation is the most necessary skill.

The professors have also declared that the programs of English I, which is the only course Electrical Engineering students receive, are inadequate since they are not based on the students' needs. Still, the professors have never been consulted about the English needed by their stu-

dents. They do not even know the programs except the one they experienced when they took English I. Finally, consulted or not, they have not done anything to help the students.

Moreover, not only have they generally not done anything, but also some of them have shown a total lack of interest in solving their students' English problem when approached by the interviewers. They seemed to be involved only in their own technical subjects, forgetting that English is a key to gaining better access to those very same subjects. The few teachers who could even be reached warmly approved of the idea of a reading program, but expected it to be prepared by somebody else.

Heads of Electrical Engineering School

The heads of the departments of the School of Electrical Engineering are also acquainted with the problem students face due to the nonexistence of technical textbooks in Spanish. The department heads know that students are able to learn to read English without having to learn to speak it. These authorities realize what the problem is, what the students need, and what should be done; yet, the measures they have taken so far have not accomplished any-

thing. When the Language Department could no longer assist them, they assumed their own coordination of English. 21/ Unluckily, that did not better the situation. If these authorities know that reading is what students need most, and that the course of English I must be specialized or technical, why have they not taken a good look at the English program and made the necessary changes to put an effective programs into practice? The heads of the School of Electrical Engineering could be pleased with a program embodying the students needs, but again, they do not seem to realize that this program should be their own central concern. Does the teaching of English look so mysterious as to keep them from taking direct action? Or is the same atomization process affecting all the subjects in the School of Electrical Engineering?

21/ See Theoretical Framework p. 14

TEST OF THE HYPOTHESIS

The directional hypothesis presented in this work states: "Electrical Engineering students of the University of El Salvador need to develop the ability to read technical English."

The data collected throughout the research clearly indicate that the ability to read technical English is what students of Electrical Engineering need to acquire most.

The interviews with the professors of Electrical Engineering confirm that most of the technical bibliography is written in English. 22/ The professors provided a list of technical books which proves that in fact 75.6% of the technical literature for the School of Electrical Engineering is written in English.

Even though there was variation on the label attached to the skill that the students had to acquire, all opinions referred to the capacity to understand written, technical English. When given the choice among the four skills, all professors unanimously selected reading as the skill most needed by Electrical Engineering students. The professors' choice was also supported by the heads of departments

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22/ See table XXXVI

of the School of Electrical Engineering.

Therefore, the directional hypothesis is accepted.

VIII

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

From the analysis and interpretation of data, the following conclusions can be drawn.

1) There are subjects in the Electrical Engineering major for which no textbooks in Spanish can be found; therefore students need to read technical textbooks in English, especially from the third year on, and reading is the logical skill that English lessons must develop.

2) The grammatical structures most frequently found in textbooks of Electrical Engineering can be reasonably predicted, and the technical textbooks used in other subjects can be a source of graduated reading material. On the basic of these facts, a specialized reading program to fit the students' needs can be prepared.

3) The majority of students can barely read a one hundred fifty-word technical passage in English; therefore, passages with similar characteristics would be a good starting point in an Electrical Engineering program.

4) The methodology used to teach English in the School of Electrical Engineering is not appropriate to develop reading skill.

5) Forty-eight hours of English instruction are not enough for students to acquire any skill.

6) Department heads and professors of the Electrical Engineering School are aware that students have problems when they consult technical books in English; yet, the authorities have not made any plans to solve the problem.

B. RECOMMENDATIONS

We recommend that:

1) The Electrical Engineering School utilize this diagnosis as the first step toward the solution of the students' English problem.

2) English be considered a technical subject, important for the acquisition of new knowledge.

3) A specialized program of English be prepared, taking advantage of the experience of all the professors, since they could provide opinions about the technical mate-

rial that could and should be included in it.

4) Development of the ability to read be the central objective of the English programs.

5) The textbooks used for technical subjects be consulted in the elaboration of the program.

6) Three terms of technical English, at least, be included in the Electrical Engineering Curriculum.

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A P P E N D I X E S

APPENDIX A

Hoja de Observación para Aplicar en el Proceso Enseñanza-Aprendizaje del Idioma Inglés a Estudiantes de Ingeniería Eléctrica de la Facultad de Ingeniería y Arquitectura de la Universidad de El Salvador.

I. Generalidades

Lugar _____ Fecha _____ Grupo _____

N°de alumnos inscritos _____

N°de alumnos en clase _____

Nombre del profesor de grupo _____

Nombre del observador _____

II. Objetivo de la observación: Se pretende, por medio de la observación, conocer el proceso de enseñanza-aprendizaje del Inglés en la Escuela de Ingeniería Eléctrica. Los resultados serán tabulados para plantear un diagnóstico.

III. Aspectos que se observarán:

A. Metodología

1. Método de Enseñanza	mucho	poco	nada
Estructuras gramaticales			
Práctica oral			
Lectura y discusión			
Traducción			
Escritura			

2. Tipos de ejercicio	mucho	poco	nada
Complementación de oraciones			
Lectura en voz alta			
Lectura en voz baja			
Preguntas y respuestas			

Discusión en grupo

Repetición

Ejercicios de sustitución

Dictado

Recitación de diálogos

B. Conducta del profesor	siempre	casi siempre	nunca	casi nunca
Llega con puntualidad				
Termina la case justo a tiempo				
Hace buen uso del tiempo				
Luce sereno y seguro				
Contesta con amabilidad				
Promueve participación del estudiante				
Corrige errores				
Premia al alumno				
Asigna tareas				
Explica situaciones no claras				

C. Conducta de los Estudiantes	La mayoría	muchos	pocos	ninguno
Asisten constantemente				
Llegan con puntualidad				
Participan espontáneamente				
Se distraen hablando				
Entregan sus tareas a tiempo				
Salen del aula justo a tiempo				
Salen antes del tiempo				
Prefieren sentarse atrás				
Toman apuntes				

APPENDIX B

GUIA DE ENTREVISTA PARA PROFESORES DE LA ESCUELA DE INGENIERIA ELECTRICA DE LA UNIVERSIDAD DE EL SALVADOR.

I.· OBJETIVO

-Obtener información para un análisis de la situación del inglés en la escuela.

II. DATOS PERSONALES

Profesión_____Posición_____

Departamento_____Facultad_____

III.PREGUNTAS

A. Importancia del inglés

1. ¿Qué importancia tiene el inglés en la carrera de Ingeniería Eléctrica?

2. ¿Para qué ocupan el inglés los estudiantes de Ingeniería Eléctrica?

3. En el aprendizaje de un idioma hay cuatro habilidades por desarrollar: "entender, hablar, leer y escribir". ¿Cuál de ellas es más útil para el estudiante de esta escuela?

4. ¿A qué nivel de la carrera es cuando el estudiante necesita más, leer libros de texto en inglés?

B. Literatura científica en inglés

5. ¿Es en verdad que hay materias en la carrera cuyos libros de texto se encuentran solamente en inglés? ¿Podría mencionar algunas materias y los nombres de los libros?

6. ¿Es verdad que en la mayoría de veces que los estudiantes de Ingeniería Eléctrica hacen trabajos de investigación encuentran que la bibliografía

a consultar está en inglés?. ¿Es eso problema para la mayoría?

7. Según su propia experiencia ¿qué características linguísticas-entre estructura gramatical y vocabulario-causa más problema al estudiante, cuando debe leer libros de texto en inglés?

8. ¿Considera usted que es difícil leer libros de texto en inglés?

9. De acuerdo a su experiencia ¿cuántos ciclos de inglés serían necesarios para que el estudiante pueda leer libros de texto en inglés?

10. ¿Conoce usted los programas que se usan para enseñar el inglés I?

11. El contenido de un programa de estudios debe estar determinado por las necesidades reales del estudiante. ¿Cree usted que en el caso del Inglés I se ha cumplido este principio?

12. ¿Cree usted que el estudiante podría dominar la lectura del inglés técnico sin tener que aprender a hablarlo?

APPENDIX C

GUIA DE ENTREVISTA PARA LOS JEFES DE DEPARTAMENTO EN LA ESCUELA DE INGENIERIA ELECTRICA DE LA UNIVERSIDAD DE EL SALVADOR.

I. OBJETIVO

-Obtener información para un análisis de la situación de el inglés en la escuela de Ingeniería Electrica.

II. DATOS PERSONALES

Profesión_____Posición_____

Departamento_____Facultad _____

III. PREGUNTAS

1. ¿Qué importancia tiene el inglés para la carrera de Ingeniería Eléctrica?
2. ¿Es verdad que el inglés es visto como una materia de relleno?
3. ¿Existe alguna materia en Ingeniería Eléctrica cuyos libros de texto estén en inglés únicamente?
4. ¿Considera usted que el Inglés I que el estudiante recibe en la actualidad es suficiente para que él pueda leer inglés técnico?
5. ¿Observó usted algún programa de inglés en ciclos anteriores?. ¿Le parecieron apropiados a los objetivos que de inglés se persiguen en la carrera?
6. ¿Qué opinión le merece el diseño de un programa de lectura de inglés técnico que recoja las necesidades específicas de los estudiantes, concerniente al inglés?
7. ¿Cuáles son, según su experiencia, los mayores obstáculos que el estudiante encuentra cuando trata de leer un texto en inglés?

8. ¿Qué destreza considera usted que necesitan los alumnos desarrollar mayormente cuando cursan el inglés?

9. ¿Cree usted que el estudiante puede obtener la habilidad de comprender el inglés escrito sin tener que aprender el hablado?

APPENDIX D

CUESTIONARIO PARA APLICAR A ESTUDIANTES QUE CURSAN INGLES I EN LA FACULTAD DE INGENIERIA Y ARQUITECTURA DE LA UNIVERSIDAD DE EL SALVADOR, C.A.

I. DATOS GENERALES

Fecha _____Carrera_____Ciclo _____

Sexo_____Grupo_____ Nivel_____

II. INDICADIONES:

El presente cuestionario tiene como objetivo explorar el interés de los estudiantes por el Inglés I y recoger sus opiniones para solventar necesidades tendientes a mejorar el proceso de enseñanza-aprendizaje de inglés técnico.

III. PREGUNTAS

A. Ingerés por el Inglés

1. Cuándo por primera vez recibisté inglés,¿te interesaba aprenderlo?

_____Si

_____No

_____No estoy seguro

Otros _____

_____

2. Si tu respuesta fue afirmativa, ¿persiste aún ese interés?

_____Si

_____No

Otros _____

_____

3. ¿Has recibido algún curso de inglés, además del inglés obligatorio impartido en tercer ciclo y bachillerato?

_____Si

_____No

Otros_____

_____

4. ¿Qué habilidad preferirías adquirir?

_____hablar inglés

_____entender inglés

_____leer inglés

_____escribir inglés

_____traducir inglés al español

_____todas las anteriores

_____ninguna de las anteriores

B. Conocimientos que posees

5. ¿Cuánto inglés sabes?

_____ bastante

_____ poco

_____ casi nada

_____ nada

6. ¿Cuál ha sido tu promedio de notas de inglés en estudios anteriores?

_____entre 4-6

_____entre 6-8

_____entre 8-10

Otro promedio_____

7. Con el inglés que has recibido hasta hoy, ¿consideras que puedes leer textos en inglés?

_____Si

_____No

_____No estoy seguro

Otros _____

_____

C. Inglés en la carrera

8. ¿Crees que el inglés es importante para tu carrera?

_____Si

_____No

_____No lo se

otros_____

9. ¿Qué crees que lograrás con el curso de inglés?

_____cumplir con un requisito

_____aprender a hablar inglés

_____aprender a leer inglés

_____aprender a traducir inglés a español

_____aprender a escribir en inglés

otras habilidades_____

10. ¿Te interesaría tomar un curso de inglés técnico relacionado con tu carrera

_____Si

_____No

_____no estoy seguro

Otros_____

11. ¿Por qué crees que la universidad te pide el Inglés I?

_____porque es importante

_____por influencia norteamericana

_____es un idioma internacional

_____como conocimiento general

otros_____

MUCHAS GRACIAS !!!

APPENDIX E

UNIVERSIDAD DE EL SALVADOR

FACULTAD DE INGENIERIA Y ARQUITECTURA

EXAMEN-DIAGNOSTICO PARA EVALUAR CONOCIMIENTOS GENERALES DE INGLES A ESTUDIANTES DE LA FACULTAD, PREVIO AL CURSO DE INGLES I CICLO I 1987-1988

INDICACIONES: El presente examen tiene dos propósitos: explorar conocimiento general de inglés, así como también su capacidad de leer comprensivamente inglés escrito. No escriba su nombre.

I. SECCION DE GRAMATICA: Encierre en un círculo el literal de la alternativa que complemente correctamente la oración.

1. Mario____in the classroom now.
   a. be b. are c. been d. is

2. The earth___ a satellite
   a. has b. have c. having d. to have

3. __Peter do his homework on time?
   a. do b. does c. doing d. done

4. Yesterday, Mario and his friends____absent from class
   a. are b. was c. were d. been

5. The students_____their written report
   a. did not brought b. did not bring
   c. do not brought d. brought not

6. _____the exam, Antonio?
   a. did you pass b. passed you
   c. did you passed d. do you passed

7. ____English before coming to the University?
   a. have you study b. have you studied
   c. have you studying d. do you have studied

8. We___ the question at last.
   a. have answered b. has answered
   c. have answer d. had answer

9. The man___ here for a long time.
   a. has be b. been c. has been d. have been

10. My wallet dictionary____ on a bus yesterday.
   a. is stolen b. was stole c. was tolen d. was steal

11. The T.V. set___ now.
   a. is being repaired b. is be repaired
   c. is being repairing d. is been repaired

12. The message_____already.
   a. have been send b. has been sent
   c. have been sent d. has been send

13. Martha is friendly_____her brother is rude.
   a. and b. too c. or d. but

14. This homework is difficult:____, I have to do it.
   a. moreover b. because c. however d. although

15. You studied a lot last night;____, you will get ten.
   a. because b. therefore c. nevertheless d. although

16. A doctor is a man____ who cures the sick.
   a. which b. what c. whom d. who

17. The sweater, ____you are wearing is Robert's.
   a. what b. which c. who d. whom

18. The old man____ saw us yesterday was Tony's grandfather.
   a. which b. who c. what d. whose

19. Bill likes _____too.
   a. to swim b. swimming d. to swimming c. swim

20. Thank you for____ the book I lent you.
   a. returning b. to return c. return d. to returning

21. Mario___for the next exam.
    a. is study b. is studying c. be study d. be studying

22. Thas is an ___ idea.
    a. interesant b. interested c. interesting d. interest

23. _____ can be both work and sport.
    a. fish b. fishing c. to fish d. fishes

24. Henry studies in a university. He is a _____.
    a. student of university b. university student
    c. students university d. university student

25. Mathematics is a_____.
    a. subject very difficult b. very difficult subject
    c. very subject difficult d. subject difficult

II. READING ABILITY

Advances in digital technology have been more spectacular than advances is switching theory. The first computers were built in the early 1950's using large vacuum tubes that had low reliability and consumed a great deal of power.

As soon as transistors became available and reliable, they replaced tubes. Later, engineers found ways to build small, efficient and inexpensive digital circuits using a single transistor, a couple of diods and a few resistors. Now, however, these discrete components (the resistors,transistors and diods) have all disappeared inside the integrated circuit. Recently, integrated circuits have become slightly larger and far more complex. The microprocessor itself is an examples of a very large scale integrated circuit containing several thousand gates.

26. Las computadoras antiguas eran _____.
    a. de transistores y diodos.
    b. confiables y consumían poca potencia
    c. hechas de circuitos integrados y resistores
    d. poco confiables y consumían mucha potencia

27. Para construir los circuitos digitales, los ingenieros utilizaron _____.
    a. tubos al vacío, resistencias y transistores
    b. computadoras, microprocesadores y diodos
    c. circuitos integrados, resistencias y diodos
    d. transistores, diodos y resistencias

28. Un microprocesador es esendialmente _____.
    a. un transistor y dos diodos
    b. un par de diodos y unas pocas resistencias
    c. un circuito integrado grande y complejo
    d. un tubo al vacío muy espectacular

29. Los circuitos integrados _____.
    a. desaparecieron dentro del transistor
    b. absorbieron los tubos al vacío
    c. desaparecieron dentro de los componentes discretos
    d. absorbieron los componentes discretos

30. La tecnología digital ha tenido _____.
    a. mejores avances que la teoría de swicheo
    b. menores avances que la teoría de swicheo
    c. no muy expectaculares avances
    d. avances poco confiables

APPENDIX F

Ciudad Universitaria, Septiembre/88

Sr. Catedrático de la Escuela de Ingeniería Eléctrica
Presente.

Nosotros, Pablo González y Matthew Alvarado, estudiantes de la Licenciatura en Inglés de la Universidad de El Salvador, a Ud. respetuosamente solicitamos su valiosa colaboración en el sentido de proporcionarnos la información que abajo detallaremos. Dicha información nos beneficiará grandemente en la elaboración de nuestro trabajo de TESIS, comprometiéndonos a darle el uso debido y confidencial.

No omitimos agradecerle anticipadamente

Nombre(s) de la(s) Materia(s) que imparte o haya impartido	Título(s) del(de los) Texto(s) utilizado(s).	Nombre Autor	De reciente o antigua edición(año).
1	1._____	1._____	1
	2._____	2._____	2
	3._____	3._____	3
2	1._____	1._____	1
	2._____	2._____	2
	3._____	3._____	3
3	1._____	1._____	1
	2._____	2._____	2
	3._____	3._____	

APPENDIX G

UNIVERSIDAD DE EL SALVADOR
FACULTAD DE INGENIERIA Y ARQUITECTURA
ESCUELA DE INGENIERIA QUIMICA

PROGRAMA DE INGLES I

I. GENERALIDADES

PRE-REQUISITOS----------BACHILLERATO
UNIDADES VALORATIVAS: 4 U.V.
AÑO ACADEMICO : 1987-1988
CICLO : I
DURACION DEL CURSO : 17 semanas
INICIO DEL CURSO : 18 de mayo 1987

EQUIPO DOCENTE

Lic. SALVADOR MAURICIO RODRIGUEZ
Coordinador. Grupo 01
Prof. ANTONIO GUZMAN M.
Grupo 05
Prof. NELSON ASTUL GONZALEZ
Grupo 02
Prof. JOSE MATTHEW ALVARADO
Grupo 03
Prof. JOSE PABLO GONZALEZ F.
Grupo 04

II. DESCRIPCION DEL CURSO

El presente curso de INGLES I ha sido diseñado para proveer al estudiante de las bases gramaticales del Idioma INGLES, acompañadas del vocabulario esencial que todo estudiante en el área de Ingeniería debe saber. Este curso contiene ejercicio de uti-

lidad práctica que sustentan el desarrollo de las habilidades de la lectura y comprensión de oraciones y párrafos de naturaleza técnica.

III. OBJETIVO GENERAL

Se persigue que al término de este curso el estudiante sea capaz de: Leer e interpretar, con relativa facilidad, oraciones y párrafos con contenido técnico.

IV. OBJETIVOS ESPECIFICOS

1. Que al término de la Unidad 1; el estudiante domine las estructuras gramaticales requeridas para la descripción de las cualidades de los materiales.
2. Que al concluir la segunda unidad el alumno utilice correctamente los patrones gramaticales en la descripción de experimentos y procesos simples.
3. Que al finalizar la tercera Unidad, el estudiante traduzca e interprete oraciones y párrafos sencillos orientados al campo de la ingeniería.
4. Que al concluir la fase final de este curso el estudiante describa, clasifique y defina en forma simple fenómenos físicos y químicos; utilizando los conocimientos desarrollados en la asignatura.

V. UNIDAD I

a) Verbo TOBE

- Forma en tiempo presente
- Preguntas y respuestas

b) Artículos definidos e indefinidos
c) Adjetivos demostrativos
d) Nombres y adjetivos
e) Grados del adjetivo
f) Descripción de colores y apariencias de materiales
g) Comparación de materiales (superioridad, inferioridad)
-Ejercicios de refuerzo

h) Descripción de las propiedades de sustancias líquidas

- Sustancias gelatinosas, pastosas, cremosas
- Sustancias sólidas, cristalinas y granulares

UNIDAD II

a) Intensificadores
b) Adverbios de frecuencia
c) Preposiciones
d) Verbos esenciales
e) Descripción de colores
f) Textura de objetos
g) Ejercicios de transformación de adjetivos, verbos y nombes.
h) Temperaturas (interpretación)
i) Ejercicios
   - Propiedades físicas de algunos materiales
   - Principios, propiedades y apariencia de sustancias
   - Ejercicios de complementación según ejercicios.
j) Preguntas y respuestas según tabla de comparación (Aluminio, Cobre)
k) Conductores potenciales del calor (ejercicio, preguntas y respuestas)
l) Colores de elementos metálicos. (Uso de tabla)
m) Preguntas de información en contexto
n) Uso de los grados positivo, comparativo de los adjetivos en comparación de metales.
o) Actividad.

UNIDAD III

a) Vocabulario en contexto
b) Ejercicios de lectura y comprensión
c) Ejercicios de lectura e interpretación

d) Ilustración de diagramas (relación entre sólidos, líquidos y gases).
e) Definiciones
f) Ilustración de diagramas para la descripción de las partes del átomo.
   - Ejercicios
g) La radioactividad
   - Conceptos
h) Descripción y predicción de fenómenos

   a- Atracción magnética
   b- Dimensión que adquiere el metal al calentarse
   c- Qué sucede cuando un material está en tensión?

UNIDAD IV

a) Ejercicios de Descripción
b) Ejercicios de complemento
c) Relación entre carga aplicada al alambre y tensión del alambre. (diagramas)
d) Descripción del diámetro interno de objetos
e) Instrumentos para medir (uso, tipo, características)
f) Diagramas
g) Ejercicios
h) Tareas

VI. METODOLOGIA

La metodología a utilizarse comprende clases expositivas que se inician con una retroalimentación del tema anterior. Seguidamente se estudia las estructuras gramaticales y el vocabulario de cada ejercicio y se completan trabajando con ejemplos, sugerencias y guías de repaso. Peródicamente se asignarán tareas de traducción e interpretación de diferentes temas del campo específico de la Ingeniería. Las clases serán conducidas en Inglés y español.

VII. EVALUACIONES

Se realizarán cuatro pruebas objetivas (exámenes parciales) cada uno de los cuales tiene un valor del 20% de la nota final y ocho tareas cuyo promedio tendrá un valor del 20% de la nota final.

VIII. BIBLIOGRAFIA

1. "DICCIONARIO TECNICO CIENTIFICO" - LAROUSSE
2. "ENGLISH FOR CAREERS" - English Language Services Inc.
3. "LADO ENGLISH SERIES" 1,2,3 - ROBERT LADO
4. "REGENTS ENGLISH WORK BOOK" - ROBERTO J. DIXON

APPENDIX I

UNIVERSIDAD DE EL SALVADOR
FACULTAD DE INGENIERIA Y ARQUITECTURA
ESCUELA DE INGENIERIA QUIMICA

I N G L E S I

U N I D A D I

"DESCRIBIENDO CUALIDADES DE MATERIALES"

MAYO DE 1987

UNIDAD I

A- All materials (glass, wood, rubber, steel, etc.) have various properties. What words are used to describe to describe these properties?

Rubber is _____

Rubber is a _____ material

Glasis a _____ material

With this materials and properties
Make.
Statements. For example

STEEL IS STRONG OR
STEEL IS A STRONG MATERIAL

1) Paper is flimsy
   Paper is a flimsy y material
2) Polythene is resilent
   Polythene is a resilient material

Many materials can be described by more than one property for example. STEEL IS STRONG AND RIGID.

Por lo tanto podemos afirmar que STEEL IS A STRON RIGID MATERIAL.

1) Glass is weak and brittle
   Glass is a weak brittle material
2) Wood is hard and stiff
   Wood is a hard, stiff material

HOME WORK. Make ten sentences with other materials, describing then with more than one property if possible.

B- Nosotros frecuentemente modificamos el sentido sobre las propiedades de los materiales. For example.

Glass is extremety brittle.
Polythylene is very resilient. (sumamente, muy, mucho)
Wood is fairly strong. (bastante, regularmente)
Rubber is quite tough. (absolutamente, completamente, del todo).

Paper is not very strong

We can therefore also say:

Glass is a extremely brittle material (quebradizo)
Polyethylene is a very resilient material (elástico)
Woods is a fairly strong material (ligera o regularmente)

Pero noten que también podemos decir:

Rubber is quite a tough material (duro)
Paper is not a very strong material

HOME WORK. Make statement about various materials again, but this time, modify the statement with the following words: extremely, very, fairly, quite, not very.

C- Ask and answer questions about the properties of various materials, using the MODIFIERS, Above. For example.

Is glass very resilient?
No, it isn't, it's very brittle
Is wool an extrmely rigid material?
No, if isn't. it's a very soft pliable material

Isn't paper very strong?
No, it isn't it's quite weak

Use the following notes to help you ask the questions:

1. Glass/resilient?
2. plythene /brittle?
3. Rubber/rigid?
4. Wool/hard?
5. Paper/strong?
6. Wood/soft?

7. paper/though?
8. steel/weak?
9. wool/rigid?
10. rubber/brittle?

D- What words are used to describe the following properties?

A material wich can be easily pulled out or stretched into a long wire or strand, is said to be _____

Materials wich are used for wires, such as cooper and aluminium, must therefore have this property

A material wich can be easily deformed by hammering or rolling is said to be _____

Whe a substance allows heat or electricity to pass along it, it is said to _____ heat or electricity.

Cooper (cu) and aluminium (Al) are _____

but glass and procelain are _____

Make sentences from this table.

Cooper (Cu) Aluminium (AL) Lead (Pb) Glass Porcelain	is	a an	extremely very fairly	good poor	insulator conductor

E- You know that we can say: Wood is fairly strong and steel is very strong. If we wish to compare steel and wood, we can say

Steel is _____ wood

Now look at this comparinsons:

Cardboard is quite strong. Paper is not very strong
Cardboard is slightl y stronger than paper

Steel is very strong. Wood is not very strong
Steel is much stronger than wood

Or:

Stell is a lot stronger than wood
Wool is very soft. Wood is not very soft
Wool is considerably softer than wood
Rubber is very tough. Paper is not very tough
Rubber is far tough than paper
But notice what we say with this properties:
Steel is slightly less ductile/sligttly more resilient than copper.

Rubber is much more flexible/much lees rigid than steel.
Or:

Rubber is a lot more flexible/a lot less rigid than steel

Glass is considerably more brittle/ considerably less resilient than wood.

Polyethylene is far more resilient/far less fragile than glass

Make statements comparing these material s:

1 - Glass/ fragile/ steel
2 - Paper/ flimsy/ wood
3 - Copper/ ductile/ irom
4 - Rubber/ rigid/ steel

5 - Cardboard/ stiff/ paper
6 - Polyethylene/ Brittle/ material/ glass
7 - Iron/ malleable/ wood
8 - Paper/strong/ cardboard
9 - Porcelain/ resilient/ material/ plastic
10 - Wood/ hard/ cardboard
11 - Cooper/ good/ conductor/ lead
12 - Iron/ poor/ conductor/ aluminium

F - All the substances described so far are solid. But of course we must be able to describe the properties of other substances.
Here are some properties of liquids and fluids:

oily thick viscous thin creamy
runny sticky free-flowing

Name some substances which have some of the properties in the list above. For example:

Milk is a free-flowing white liquid.

Some substances are between solid and liquid for. Such substances may be be in the following forms.

Some solids may be found in the following forms:

Powder (adjective: powdery)
Crystals (adjective: granular)
Fillings
Chips
Flakes (adjective: glaky)
Shavings

We some times describe this further by using fine or coarse.
For example:
Fine
Coarse

refined sugar consists of fine white granules.

Fine Iron filings are used to show the presence of a magnetic field.
A substance such as sand may be either fine or coarse

Now use the woes above to describe the following substances as fully as possible.

1. Jam
2. Toothpaste
3. Butter
4. Salt
5. Glue
6. Oil for motor car
7. Sand
8. Instant coffee
9. Honey
10. Chalk

What are the theree colours of light which together form white ligt? _____, _____, _____.

What colours are made by mixing these three colurs? What are the colurs of the spectrum called in English?

We can modify our descriptions of colours by saying:

light blue or pale blue
dark blue or deep blue
bright yellow
dull brown

Describe the colours of some objects in the classroom. Ask and answer questions using this table. For example.

What colour is the chair?
It's dark brown
Is the floor light green?
No, it isn't. It's dark blue

Light	red
dark	blue
pale	green
deep	yellow
bright	orange
dull	purple
	brown
	grey
	pink

When an object is not exactly one colur, we can add-ish to the colour For example:

red	reddish
blue	bluish
yellow	yellowish
(but: silver	Silvery)

When an object is between two colours, we often say: reddish-brown, bluish-yellow, greyish-greyish-green, etc. (we can alos say: lightish blue, darkish grey, etc.)
For example:

Copper is a reddish= brow colour

The sea is a bluish-green (or greenish-blue) colour

Describe more of the objects in the room, and objects your teacher presents, using these approximate expressions of colour. Ask and answer questions about the colours of things.

What colour are these?

amber _____ mauve _____

bronze _____ turquoise _____

crimson _____ khaki _____

Comlete these statements

A. material which allows light to pass through it is _____ Glass is _____. (Glass is a _____ substance).

A material which does not allow light to pass through it is _____. Steel is _____ A material which allows some light to pass through it is _____ Ground glass or "frosted" glass is _____.

Substances which have no colour (like water) are _____ water is a _____liquid.

A white liquid is sometimes said to be _____or _____. Carbón dioxide turns water.
_____.

When an object or substance is dirty: it is said to be _____.

As well as colour, objects have different of "suffuce" or "appearance". Surfaces can be:

Bright	Glossy
Shiny	Mat/matt
Dull	

They can also be:

- Smooth
- Rough
- Uneven
- Coarse
- Grainy
- Corrugated
- Pitted
- Abrasive

Complete these descriptions together with your teacher, Your teacher will help you with new words.

1. Glass is a _____ solid which usually has a _____surface.

2. Chalk is a porous solid which as a) _____surface

3. Some cardboard is _____ to give it extra strength

4. The inside of a camera has a _____ surface

5. Mercury is a liquid metal which as a _____ appearence.

6. Sand paper has a _____surface.

7. An unplaned piece of wood has a _____ surface.

8. A piece of rubber has a _____surface.

Describe the appearence and texture of:

1- This paper
2- The walls of the room
3- The floor
4- The surface of a tree-trunk
5- A leaf

Here is a table givin descriptions of four metals. Ask and answer questions about the metals properties colour and appearance.

Aluminioum (AL)	Bluish-white solid, very soft, light, malleable and ductiles. Very good conductor. Shiny when clean.
Copper (Cu)	Reddish solid, malleable and ductile. Shiny when clean. Very good conductor.
Iron (Fe)	Greyish-white solid. Soft malleable and ductile. Magnetic. Shiny when clean.
Lead (Pb)	Greyish solid, soft, heavy, ductile. Dull.

Describe the colur, appearance and texture of the objects Your teacher shows you. Use the following headings: colour, appearance, texture.

VOCABULARY

Glass:	vaso, copa, lente, anteojo
Rubber:	caucho, goma elástica
Steel:	acero, acerado
Polyethylene:	polietileno
Wood:	madera, madero
Wool:	lana, vello
Paper:	papel, periódico, apuntes, artículo
Porcelain:	porcelana, loza fina
Stiff:	rígido
Flimsy:	débil
Strong:	fuerte, concentrado, enérgico, intenso
Weak:	frágil, débil, poco resistente
Resilient:	elástico, resorte
Tough:	duro, resistente, fuerte (metal)
Brittle:	quebradizo, frágil, vidrioso

Flexible:	flexible, dócil (plástico)
Elastic:	elástico (caucho)
Rigid:	rígido, inflexible, tieso
Statement:	planteo, enunciado, relato
Pliable:	dócil, plegable, manejable
Soft:	blando, plástico, dúctil, maleable, suave
Hard:	duro, rígido áspero, tosco
Fragile:	frágil, quebradizo
Sentence:	oración
Oily:	aceitoso, oleoso, grasiento
Thick:	espeso, denso
Viscous:	viscoso, glutinoso, pegajoso
Thin:	aguado, ralo, transparente
Creamy:	contiene nata
Runny:	en movimiento, corredizo
Sticky:	pegajoso, viscoso, pegadizo
Free-flowing:	flujo suelto, flujo libre
Paste:	pasta
Powder:	polvo
Crystals:	cristales
Granules:	gránulos
Filings:	limaduras, virutas
Chips:	astillas, viruta
Flakes:	hojuelas, escamas, laminillas
Shavings:	virutas, raspaduras, alisaduras
Fine:	fino, menudo, puro, refinado
Coarse:	tosco, áspero, granulación gruesa
Jam:	conserva, embutido, jalea
Tooth paste:	pasta de dientes
Butter:	mantequilla, manteca
Salt:	sal
Glue:	cola (pegar)
Sand:	arena
Honey:	miel