

# Designing a Reading Comprehension Course

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## Introduction

In this paper we will describe the steps followed to create a reading comprehension course directed at Spanish-speaking university students of computer sciences. The main objective of the course is to help students practice the different reading strategies and identify the rhetorical functions and grammar which will enable them to read and understand technical texts, so they can use the computer more efficiently.

In informal talks some students declared their need to take a course that might help them to understand English manuals; however, we could not design a course just basing it on some students' comments, nor on our pure assumptions so that is why we conducted the following survey.

## 1. Needs Analysis

First, we had to determine if all the students needed a course to help them read English manuals, taking into consideration that on this campus there are 26 study programs divided into three divisions: Biological and Health Sciences (B.H.S.), Social Sciences and Humanities (S.S.H.) and Basic Sciences and Engineering (B.S.E.).

## 2. Structured Interviews

In order to determine if all the students needed this course we gave two sets of structured interviews related to the use of computers: one to the employees of the Computer Center and the other to the teaching staff. Moreover, we gave questionnaires to a representative sample of learners who usually go to the Computer Center.

It was only necessary to interview four people from the Computer Center as they were familiar with the types and number of computers, percent of the English manuals, characteristics of the courses given, etc.

In order to interview the teachers, we did the following: The teaching staff, whose students have to go to the Computer Center must fill in an application form, so their students can use the computers. From these forms we got the teachers' data such as: name, group, subject and extension. We got in touch with the teachers to interview them and ask them for their lists of students. We interviewed six teachers from B.H.S., seven from S.S.H. and nineteen from B.S.E.

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From a total population of 1261 students (208 [16.50%] from B.H.S., 318 [25.20%] from S.S.H. and 735 [58.30%] from B.S.E. according to the teachers' lists) by means of a statistical method, we selected a representative sample of 216 students: thirty six from B.H.S., fifty six from S.S.H. and eighty from B.S.E.

Forty eight volunteers from two English groups helped to hand out and collect the questionnaires.

## **2.1 Questionnaires**

Three questionnaires were written to gather information. There were two versions of each. The aim of the first versions was to determine which questions had been poorly or ambiguously phrased and if any important information was missing. The second versions were used. (See Appendix 1)

The first questionnaire was for the personnel from the Computer Center, the second for the teaching staff and the third for the representative sample of students.

## **2.2 Results**

According to the results, most of the learners who go to the Computer Center belong to the Basic Sciences and Engineering Division (735 [58.30%]). Most of the teaching staff of the B.S.E. division (82%) suggest that their students read English books about Computer Science. Also the B.S.E. students said the reading comprehension course would be useful (61% of the students) and interesting (56%), although some students of the other divisions said they needed this course too.. For more information about the results, see Appendix 2.

As a result of the surveys, it was found that the course should last one trimester (approximately 40 hours), the reading material should be on programming languages although we could include some texts extracted from a word processing manual. The bibliography, obtained from the students' questionnaires, was considered during the selection of textbooks.

## **3. Proficiency Tests**

Taking into consideration that one of the students' answers indicated that they had difficulty reading the textbooks and manuals, it was decided to apply five tests to some of these students in order to measure their knowledge of English and their reading ability in this language

### **3.1 Description of the tests used**

In order to discover the learners' proficiency in English, two tests were given. The first was the TEAL test battery of English language proficiency for adult students (Carolina Clapham, 1975) and the second included some connectors and grammatical points that appear frequently in textbooks and manuals. To design this test (from now on

referred to as *connectors*), a traditional quantitative grammar analysis was performed. Besides, three reading comprehension tests on Computer Science were also utilized. These tests were on different levels of difficulty in relation to the subject matter.

### 3.2 The Sample

Fifty three students took the tests (seven from B.H.S., thirteen from S.S.H. and thirty three from B.S.E.) In order to get in touch with these students, we got their telephone numbers from the questionnaires. These students belong to different study programs and had different English levels.

### 3.3 Results

The following results indicated that more than 50% of the learners failed the proficiency tests and more than 50 learners did have difficulty in reading texts on computer science.

	English Proficiency		Reading Comprehension		
	TEAL	Connectors	1	2	3
<b>Passing students</b>	37.7% (20)	39.6% (21)	41.5% (22)	49.1% (26)	47.2% (25)
<b>Failing students</b>	62.3% (33)	60.4% (32)	58.9% (31)	50.9% (27)	52.8% (28)

*Table 1: Results of proficiency tests. Total = 53 students*

After an item-analysis of the English language tests, the items with a high level of difficulty were chosen to be included as teaching points in the computer course.

Once the course design was determined, the theoretical basis for reading and writing was determined. For reading, we reviewed Kenneth Goodman (in F. Smith, 1973) and Frank Smith's psycholinguistic studies (1978) as well as applied linguistic surveys by Henry Widdowson (1974, 1979), Charles Alderson (1977a, 1977b, 1984), Fernando Castaños (1980), and Martha Villafuerte (1983). We based our design of the written language on research carried out by John Lackstrom, Larry Selinker, Mary Todd and Louis Trimble (1976a, 1976b, 1978).

## 4. Selection and Grading of the Texts

The readings were authentic texts selected from the bibliography suggested by the students' questionnaires and chosen through the following criteria: They must be basic texts in Computer Science, relevant and of interest to the students as well as "useful pedagogically", i.e., they were useful for developing exercises that would help reach the course's aims and to have representative characteristics of the texts that students would have to read. (Castaños 1986)

The texts themselves required from elementary to advanced knowledge of the subject. The linguistic difficulty of the texts was not considered at all.

Most of the exercises are grouped as *process*, aimed at helping comprehension, not only of one particular text, but also of others; and *product* to check whether comprehension has occurred and to determine and attack the students' difficulties, rather than to test them. (Alderson 1978)

The units of study present reading strategies and exercises such as: anticipation, contextual reference, guessing or inferring unknown vocabulary, word building and transfer of information among others.

### **5.. Pre- and Post-tests/Questionnaires**

Pre- and post- tests were designed to measure comprehension and reading abilities the learner acquired throughout the course. Moreover, the students have to go to the Computer Center to practice the instructions they have read in manuals during the class, so we are not only testing *usage*, but also *use*. In other words, we are using the language with a communicative purpose.

During the pilot run of the reading material, the students had to hand in an anonymous questionnaire (see Appendix 3) in which they had to write their suggestions and views about the texts, instructions and exercises.

### **6. Conclusions**

Based on the results of the needs analysis, we got important data such as: the students towards whom the course would be directed and some basic characteristics the course should contain.

The proficiency test results indicated that most of the students did need the course and that some grammar points should be included.

Based on the results of the pre-/post-exams to date we can conclude that the course has been useful since it helps students to develop strategies that will enable them to read and understand Computer Science textbooks in English. From the anonymous questionnaire results, we made some modifications in the course, i.e., we added more reference exercises and exercises to infer important vocabulary from context. But, in general, the students' comments about the course were favorable.

It is expected that this course will be a motivation for the students to practice what they have learned throughout the course in other kinds of textbooks.

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## Appendix 1

### Entrevista estructurada para el personal del Centro de Cómputo (2ª versión)

1. ¿Qué tipo de computadoras hay aquí?
2. ¿Cuál es la más usada?
3. ¿Es probable que cambien de computadoras?
4. ¿Para qué sirven los manuales?
5. ¿Qué proporción de los manuales están en español, inglés u otro idioma?
6. ¿Cuántas copias existen de cada manual?
7. ¿Cuánto tiempo les permiten a los estudiantes consultar los manuales?
8. ¿Cuánto tiempo pueden usar las computadoras?
9. ¿Cuál es el horario del Centro de Cómputo?
10. Aproximadamente, ¿qué número de estudiantes usa cada terminal por trimestre?
11. ¿Cuáles son las características de los estudiantes que vienen a usar las computadoras: carrera, trimestre, etc.?
12. ¿Hay algún instructor que les auxile al estar usando las computadoras?
13. ¿Cree que un curso de comprensión de manuales de computación sería útil para los estudiantes? Diga por qué.
14. ¿Ustedes imparten algún curso para los estudiantes?
15. ¿Cuál es el contenido de éste?
16. ¿Y su duración?
17. ¿Cuántas veces por trimestre lo imparten?
18. ¿Cómo lo anuncian?
19. ¿Es obligatorio?
20. ¿Cuáles son los manuales más solicitados por los estudiantes?
21. Nombre.
22. ¿Cargo que desempeña?

**Entrevista estructurada para profesores cuyas materias se relacionan con el uso de computadoras  
(2ª versión)**

1. ¿En qué materia(s) usted les pide a sus estudiantes que asistan al Centro de Cómputo?
2. ¿En qué trimestre se imparte(n) dicha(s) materia(s)?
3. ¿Cuántas veces ha impartido esta(s) materia(s)?
4. ¿Piensa usted seguir impartíendola(s)?
5. Número de estudiantes en esta(s) materia(s)
6. ¿Qué tanto por ciento de *libros de computación en inglés* les pide a sus estudiantes que lean esta(s) materia(s)?  

Aprox.	100%	75%	50%	25%	10%	Nada
--------	------	-----	-----	-----	-----	------
7. ¿Es obligatoria  u opcional  ?
8. ¿Qué tanto por ciento de *libros de computación en español* les pide a sus estudiantes que lean en esta(s) materia(s)?  

Aprox.	100%	75%	50%	25%	10%	Nada
--------	------	-----	-----	-----	-----	------
9. ¿Es obligatoria  u opcional  ?
10. La asistencia al Centro de Cómputo es obligatoria  u opcional  ?
11. ¿Para qué manda a sus estudiantes al Centro de Cómputo?
12. ¿Lleva usted un control de los estudiantes que van al Centro de Cómputo?
13. ¿Cómo lleva dicho control?
14. ¿Qué peso le da a la tarea realizada en el Centro de Cómputo para la calificación final?  

<input type="checkbox"/> 0%	<input type="checkbox"/> 25% Aprox.	<input type="checkbox"/> 50% Aprox.	<input type="checkbox"/> 75% Aprox.
-----------------------------	-------------------------------------	-------------------------------------	-------------------------------------
15. Los estudiantes al ir al Centro tienen que consultar los manuales que se encuentran ahí?  

Sí <input type="checkbox"/>	No <input type="checkbox"/>	o usted les dice cómo usar la computadora? <input type="checkbox"/>
-----------------------------	-----------------------------	---
16. Si es que consultan manual(es), ¿qué manual(es) tienen que consultar?
17. ¿Qué tipo de curso sería más útil para sus estudiantes?  

<input type="checkbox"/> Uno de comprensión de libros y manuales de computación en inglés.
<input type="checkbox"/> Uno de inglés general para oír, hablar, leer y escribir.
18. El curso sería usando:  

<input type="checkbox"/> manuales solamente.
<input type="checkbox"/> libros de computación solamente.
<input type="checkbox"/> manuales y libros de computación.
<input type="checkbox"/> revistas con temas de computación.
<input type="checkbox"/> otro.
19. Si hubiera posibilidades de elaborar un curso de comprensión de textos y manuales de computación, ¿para qué trimestre sería conveniente?  

<input type="checkbox"/> 3º	<input type="checkbox"/> 4º	<input type="checkbox"/> 5º	<input type="checkbox"/> 6º
<input type="checkbox"/> 7º	<input type="checkbox"/> 8º	<input type="checkbox"/> 9º	
20. Nombre \_\_\_\_\_
21. Extensión \_\_\_\_\_ Horario \_\_\_\_\_
22. Comentarios adicionales.



## Cuestionario para el estudiante (2ª versión)

La Sección de Lenguas Extranjeras de esta universidad estudia la posibilidad de abrir en el futuro un curso para la *comprensión de libros y manuales de computación en inglés*. Tus respuestas servirán para determinar si se abre dicho curso. Al terminar, por favor, entrega el cuestionario a la persona que te lo dio.

Instrucciones: En algunas ocasiones tendrás que dar respuestas completas y en otras, sólo marcar con una X la opción que mejor se adecue a tus respuestas.

1. División:            CBI           CSH           CBS
2. Carrera \_\_\_\_\_
3. Trimestre:
 

<input type="checkbox"/> 4º	<input type="checkbox"/> 5º	<input type="checkbox"/> 6º	<input type="checkbox"/> 7º	<input type="checkbox"/> 8º
<input type="checkbox"/> 9º	<input type="checkbox"/> 10º	<input type="checkbox"/> 11º	<input type="checkbox"/> 12º	<input type="checkbox"/> maestría
4. Sexo:             F                     M
5. Edad: \_\_\_\_\_
  
6. ¿Qué tipo de curso es *más útil* para ti? (Marca sólo uno).
  - Comprensión de libros y manuales de computación en inglés.
  - Inglés general para: oír, hablar, leer y escribir.
  
7. ¿Qué tipo de curso es *más interesante* para ti? (Marca sólo uno).
  - Comprensión de libros y manuales de computación en inglés.
  - Inglés general para: oír, hablar, leer y escribir.
  
8. Tu asistencia al Centro de Cómputo es:  obligatoria             opcional
  
9. Consultas los manuales en inglés que están en el Centro de Computación?
 

Sí <input type="checkbox"/>	No <input type="checkbox"/>
-----------------------------	-----------------------------
  
10. Respeto a los manuales:
  - Sí los consultas, pero *te cuesta trabajo entenderlos*. (Pasa a preg. 12)
  - No los consultas, *porque no les entiendes*. (Pasa a las preg. 11)
  - Sí los consultas y les entiendes. (Pasa a la preg. 11)
  - No los consultas porque tu profesor te da las instrucciones (Pasa a la preg. 12)
  - No, los consultas porque ya sabes usar la computadora. (Pasa a la preg. 12)

11. No entiendes los manuales porque consideras que: (Puedes contestar más de una.)

- Te falta conocimientos sobre el uso de manuales: formato, abreviaturas, etc.
- No conoces el inglés técnico que se usa en computación.

Te faltan conocimientos de computación en:

- manejo de los computadores.
- manejo del lenguaje de cómputo, ejem.: Basic, Pascal, etc.

12. Respeto a los *libros* de computación en inglés:

- no te han sugerido leerlos.
- los lees sin ninguna dificultad.
- los lees pero te cuesta trabajo entenderlos
- no los lees porque te cuesta trabajo entenderlos.

13. ¿Qué materia sería útil para ti en un curso de lectura?

- Solamente *manuales* de computación en inglés.
- Solamente *libros* de computación en inglés.
- Manuales y libros* de computación en inglés.
- Otros. (Específica)

14. Si se diera un curso de comprensión de textos de computación y tomando en cuenta tu carga de trabajo, ¿cuántos trimestres debería durar dicho curso?

- 1 trim.
- 2 trim.
- 3 trim.
- 4 trim.

15. Da los títulos y capítulos de *manuales* que hayas usado y que te costaron trabajo entender (si no los recuerdas, ve a la sección de "Atención a usuarios" al Centro de Cómputo y copia los títulos y capítulos.)

16. Da los títulos y capítulos de los *libros* de computación en inglés que te gustaría se leyeran en el curso (si no los recuerdas desprende esta hoja y lleva la información al edificio H-055 en la *Sección de Idiomas* de 8.30 a.m. a 5 p.m.)

Estas dos últimas preguntas son muy importantes, por favor, contéstalas.

17. Nombre: \_\_\_\_\_

18. Teléfono: \_\_\_\_\_

Gracias por tu colaboración.

## **Appendix 2**

### **Needs analysis results**

Below we list some of the most important results obtained from the needs analysis:

#### 1. Personnel of the Computer Center

- 99% of the manuals from the Computer Center are in English.
- There will be approximately more than one hundred and fifty new personal computers (PC) for the students.
- The students use the computer to program, print, use packages, draw graphs, write texts, etc.
- The timetable of the Computer Center is from 8 AM to 3 AM, Monday through Friday and from 8 AM to 2 PM, Saturday and Sunday.
- The original manual and sometimes up to three copies of each manual are available in the Computer Center.
- When the original manual only is present, the student must consult the manual in the Computer Center (two-hour limit), but if there is more than one copy and it is not requested frequently, the student can borrow it for 72 hours.
- As there are few copies of the manuals and a limited period when the students can consult them, it is advisable for the students to understand them when they consult them.
- 60% of the students who usually go to the Computer Center belong to the B.S.E. division.
- There are two instructors: One in the morning and the other in the afternoon.
- The personnel of the Computer Center do consider the reading comprehension course useful for the students because:
  - When the students see the manuals are written in English, they prefer not to read them.
  - The students do not usually understand the messages that appear on the screen.
  - Because the students sometimes do not know how to program, they waste paper.
  - When a student has problems with the computer and if the instructor is busy, the student asks for assistance from his/her classmates who are nearby, interrupting them and their concentration suffers.
- There are only three courses given by the personnel of the Computer Center. Each course lasts six hours. There are two groups of each course, one in the morning and the other in the afternoon. These courses are not obligatory.

Comments: The manuals suggested by the personnel were considered while selecting texts.

#### 2. Teaching Staff whose Subjects are Related to the Use of Computers

- Most of the students who go to the Computer Center belong to the B.S.E. division. There are twenty-three subjects from the B.S.E. division (57.5%), seven (17.5%) from B.H.S. and ten (25%) from S.S.H.

- The percentages of English books on Computer Science suggested by the teaching staff is higher in the B.S.E. division. The results are listed below:

**English Books on Computer Science Suggested by the Teachers**

B.H.S.		S.S.H		B.S.E.	
Subjects	Books	Subjects	Books	Subjects	Books
7	0%	4	0%	4	0%
Total: 7		2	5%	1	10%
		2	10%	1	20%
		2	15%	2	25%
		Total: 10		2	40%
				3	50%
				2	75%
				2	80%
				1	90%
				5	100%
				Total: 23	

- The attendance to the Computer Center is obligatory in twenty-eight subjects (70%) and optional in twelve (30%).

Division	Obligatory	Optional
B.H.S.	4	3
S.S.H.	6	4
B.S.E.	18	5
Total	28 (70%)	12 (30%)

- The homework done in the Computer Center is important for the final grade from 20% to 60% in the three divisions.
- 93.8% of the teachers considered the reading comprehension to be useful.
- 78% of the teachers suggested that the reading material should be extracted from textbooks, manuals and magazines.
- 60% of the teachers suggested that the reading course should be given while the student was taking the first subjects where he had to use the computer.

**3. Students**

Most of the students from the sample belong to the B.S.E. division (46.5%), 32.6% belong to S.S.H. and 20.9% to B.H.S.

- Twenty-three (63.9%) students from B.H.S., thirty eight (67.9%) from S.S.H. and fifty six (70%) from B.S.E. declared that they had difficulty reading English manuals.

- 68% of the students said one of the reasons they could not understand the manuals was that they did not know the technical English used in the manuals.
- 57% of the students said they had difficulty reading the English books. Results are listed below:

**Students Opinions about the Books in English**

	Students	
The teacher has not suggested reading them	61	(35.4%)
Student reads the books without any difficulty	8	(4.7%)
Student reads the books with difficulty	59	(34.3%)
Student does not read them because they are too difficult	39	(22.7%)
No response	5	(2.9%)
Total	172	

- 51.2% of the students said that the course should last only one trimester.
- 61.2% of the students from B.S.E. considered the reading course to be useful and 56.3% of the students from B.S.E. thought it would be interesting.
- According to the bibliography, most of the students from B.S.E. read manuals on programming languages such as TURBO Pascal, LANGUAGE C. FOREST, FORTRAN and the Word-Perfect and Chi-Writer packages, while the students from B.H.S. and S.S.H. read manuals on computer packages such as Scatter Graph, LOTUS 1-2-3, D-BASE, Number Cruncher and Word Perfect.

Note: Based on the interviews with the teacher from S.S.H., it was discovered that the study programs of this division were Going to be modified to include some new subjects on computer science. It is important to note that depending on whether the S.S.H. study programs are modified or not, a new course will be created for them in the future.

Comments: The manuals suggested by the students were also considered during the selection of texts.

### Appendix 3 Pilot questionnaire

No escribas tu nombre. Contesta lo más sinceramente posible.

TRIMESTRE: \_\_\_\_\_

1. Los textos más interesantes fueron: \_\_\_\_\_  
porque \_\_\_\_\_

2. Los más aburridos: \_\_\_\_\_  
porque \_\_\_\_\_

3. Las instrucciones fueron claras: \_\_\_\_\_ e.g. \_\_\_\_\_  
no-claras: \_\_\_\_\_ e.g. \_\_\_\_\_

4. Los ejercicios que más me gustaron fueron: \_\_\_\_\_  
porque \_\_\_\_\_

5. Los ejercicios que NO me gustaron fueron: \_\_\_\_\_  
porque \_\_\_\_\_

6. ¿Cómo crees que fue tu aprovechamiento del curso?  
Excelente \_\_\_\_\_ Bueno \_\_\_\_\_ Regular \_\_\_\_\_ Bajo \_\_\_\_\_

7. Las causas de dicho aprovechamiento fue debido a:  
Mí \_\_\_\_\_ porque \_\_\_\_\_  
Al material \_\_\_\_\_ porque \_\_\_\_\_

8. A la vuelta de la hoja escribe tus comentarios generales del: 1. Curso, 2. Material, 3. Tus sugerencias.