

Improving Reading Skills in Adult Deaf People: The Spanish MÀS Module

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In this paper the main lines of the Spanish module of the MAS (Making Access Succeed) project, financed by the European Union as part of the Leonardo da Vinci initiative, are explained. Its main objective is to develop and test the effects of the usage of an instruction system designed to improve reading comprehension in adult people with profound pre-lingual deafness, in their majority Spanish sign language users, via the employment of direct instruction sessions, and computer-aided sessions through the use of an Information Technology tool called SIMICOLE-2002. The factors leading to the building of the instructional system, its contents and the characteristics of the group of users to whom it is currently being applied are described.



1. General Objective and antecedents.

The content of this work describes the undertakings developed in the Spanish module of the MAS (Making Access Succeed for deaf and disabled students) project thanks to the participation of ACCESO Research Unit from the Department of Developmental and Education Psychology, the University Counselling Service for Students with Disabilities (both pertaining to the University of Valencia), and the Deaf Persons Federation of the Valencian Community (FESORD-CV). In this module, an instruction system for adult deaf persons has been created with the aim of improving their skills involved in reading comprehension. To achieve this, one of the key support factors has been the use of the Information Technology field. In this way we seek to cooperate with the general objective of the MAS project, designed to facilitate the acquisition of skills in deaf and disabled people in order to improve their chances of accessing higher levels of education and training, and the labour world. A secondary aim is experimentation with Information and Communication Technologies in its role as a training aid adapted to this particular group of people.

Participation in this project has its origin in the line of work begun in the context of the ACCESO 25 project, financed by the European Union through the HORIZON initiative, which concluded in December 1999. During the project's development, whose objective was to favour university access for students with disabilities, numerous problems related to adaptation and continuation of studies for people with different kinds of disability came to light (see Alcantud et al 1995), as well as the multiple obstacles which this group of students were confronted by in their access to these training levels.

The legal provisions developed in Spain since the beginning of the eighties concerning education for people with disabilities have brought about a notable change in the provision of assistance, which facilitates education and training in the most normalised possible contexts, although the numbers of students with disabilities at primary and secondary level are a long way from corresponding with the proportion that would be expected at post-obligatory education levels. Let us take as a representative example the case of students with deafness: whilst 20% of young Spaniards gain access to university, only 1% of young deaf people end up on university courses.

Aware of this problem, several undertakings designed to ameliorate the factors making university access difficult for people with disabilities were developed during the ACCESO 25 project. In this line of work, and in direct relation to people with deafness upon whom this study is centred, one of the key variables is the low level of reading comprehension achieved. In a study carried out by Villalba, Ferrer and Asensi (1999) on deaf and hearing university students, and deaf aspirants who do not gain access to university, we were able to verify that deaf people who attain university access compared with other deaf people who do not, have a more marked difference in their reading levels, which are similar to those obtained by hearing students, independently of the level of auditory loss or the moment when deafness appeared. This tallies with the myriad studies based on the reading ability of deaf students carried out both within our country (Asensio, 1989; Asensio y Carretero, 1990) and outside it (Furth, 1966; Conrad, 1979; Quigley and Paul, 1984).

This situation is one of the determining factors which led to the initiation of specific undertakings designed to improve abilities related with reading comprehension in adult deaf people, whose tangible outcome was the computer programme called SIMICOLE (Multimedia

Instruction System for Reading Comprehension) (Alcantud et al., 2000), whose first application and results (Alcantud et al., -press articles-) upheld its validity. 23 deaf people began their participation in that pilot project following the SIMICOLE program as an instructional medium. Of these, eight completed it in its entirety (two of them sign language users and six who gave preference to oral language as their communication medium). Amongst the essential aspects, the first, easily predictable conclusion we drew was the fact that being familiar with, and frequently using oral language, was a determinant factor in making good use of the program, although only in terms of the reading comprehension tests applied before and after its use, and not so much in relation to the exercises in the program itself. The second relevant factor we would like to highlight is that in spite of the advantages offered by the technology in relation to individualisation for intervention in processes of a psycho-educative nature, the lack of maturity shown by the majority of deaf persons in terms of their capacity to regulate their own learning process led to a clear lack of useful exploitation. In other words, although a computer system like SIMICOLE implies the setting in motion of several underlying processes implicit in reading for the learner (comprehension of the lexis relevant to the text, construction and establishment of a hierarchy of ideas, synthesis, evocation of previous knowledge etcetera) the lack of reflection on the learning processes themselves impeded the consolidation of the learning strategies mobilised.

Participation in the MÀS project has allowed for the continuation of this line of work introducing several modifications which have given rise to the development of LEECOM (Read and Comprehend) which includes the information technology tool that came to be called SIMICOLE-2002 as one of its essential elements, together with the introduction of tutor-guided sessions where the main strategies for effective reading comprehension are taught explicitly, using sign language as the fundamental means of communication.

2. LEECOM. LEE y COMprende. Program for the improvement of reading comprehension in adult deaf people.

2.1. Basis.

Leaving to one side the low level processes in accordance with the characterisation established by De Vega *et al* (1990) (identification of letters, their phonetic transformation and the construction of a representative phonology of the word), good reading comprehension requires four types of basic knowledge which interrelate in an interactive manner:

- general knowledge about the oral language
- encyclopaedic knowledge related with the subject matter of the text in hand
- knowledge of the organisation (structure) of the text
- knowledge of strategies to reduce the semantic information, connect it and relate it to the base of previous knowledge

Adult deaf persons with profound pre-lingual deafness have, for the main part, considerable gaps in each of these four factors. Their background in relation to oral language tends to be fairly deficient, except in cases where certain variables (early detection together with an optimum prosthetic hearing system, efficient parental implication, specialised intervention from the moment of detection, etcetera) play a compensatory role. Many deaf people are led to a situation of socio-cultural deprivation owing to their linguistic poverty, even more so when they have not acquired visual-gestural communication codes, which in turn leads to the lack of a large quantity of information that any person would normally accumulate. A general understanding of written oral language tends to present a challenge difficult to overcome for many of them, which ends up putting them off reading. They do not have the habitual practice which characterises hearing subjects, accustomed to coming across texts of diverse nature and structure. Finally, this lack of reading experience impedes the exercise of diverse cognitive operations of a general nature aimed at an efficient handling of information. This is the case in the selection of ideas, the establishment of relationships, their organisation, and the capacity to increase their store of knowledge incorporating new data.

In this situation, and considering reading as essential for autonomous learning and posterior social projection, we have endeavoured to try out LEECOM formulas which allow us to improve the strategies used by deaf people to come to terms with reading. This is achieved by increasing their motivation to read, and by reducing as far as possible the frustration commonly experienced when they are confronted by written texts, whilst being aware of the impossibility of completely overcoming the obstacles imposed by the severe combined deficiencies which people with profound pre-lingual deafness suffer from in terms of the four factors mentioned above.

2.2 Content.

LEECOM consists basically of two phases, marked fundamentally by two differential aspects: the context of the work (group vs. individual) and the kind of support (learning via a tutor vs. learning via computer).

The aim of the first phase is to develop group activities designed to teach, practice and consolidate strategies in order to comprehend, select and structure the principal ideas of the texts; assisted by the presence of a bilingual tutor (Oral Language-Sign Language) whose fundamental task, based on the positing of seven texts, is: 1) to guide the initial talks/discussions in which preliminary information about the theme of the text is obtained, concentrating especially on knowledge of an encyclopaedic nature necessary for a minimum comprehension; 2) to support linguistic deficiencies by explaining vocabulary and expressions of difficult comprehension that come up in the text; 3) to co-operate in the extraction of the ideas expressed in the component phrases of the text; 4) to make explicit the meaning of the text's structure; 5) to model strategies for organising the information through the elaboration of diagrams which show a hierarchical structure of the text's meanings; 6) to facilitate the elaboration of the text's synthesis.

In the second phase the learner continues his or her instruction individually, computer-aided through the SIMICOLE 2002 program. This information technology tool contains several elements which continue to consolidate the strategies taught in the preceding phase. In the following section we shall explain the relevant aspects of the program in more detail.

3.2.1. Simicole 2002 - Multi-media tool to improve reading comprehension in adult deaf people. Computer support application for the LEECOM program.

SIMICOLE 2002 is made up of a total of 30 texts related to ten themes (Leisure and Free Time, The Media, The Sea, Science, Ecology, Politics and Economics, Women, Valencia, Health and The University), spread out over three difficulty levels comprised of ten texts per level. The preceding version (SIMICOLE) was made up of 58 texts sequenced in a growing order of difficulty, based on the qualitative criteria of a group of five experts, which included characteristics such as complexity of the vocabulary contained, the kind of grammatical structures employed and its propositional density.

In the case of SIMICOLE 2002 modifications have been made in its sequencing, based on the results of the pilot project, taking into account the difficulty added by the exercises posited at the end of each text as a new mode of reference.

Each of the texts is accompanied by:

- Features that help to situate the person in the text's contents (see figure 1):
 - The title, which anticipates the theme.
 - An image which helps to evoke ideas related to the text.
 - An introduction which centres the reader on the text's theme in more detail.The same introduction also appears in Spanish Sign Language (Referred to henceforth as SSL)

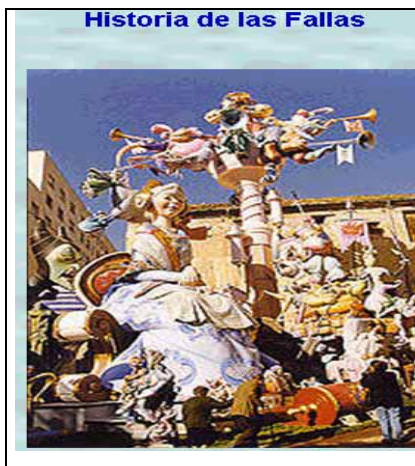


Figure 1. Title and image



Figure 2. Introduction to the text

- A text which includes definitions of words and expressions of difficult comprehension, both in oral written language and in SSL (figure 3).
- A series of practice and training exercises (figure 4) whose objective is:
 - To improve morphological and syntactic aspects of special difficulty for deaf persons
 - To increase the person's lexical repertoire with words and expressions contained in the text
 - To situate the text's essential information and to help structure this information.

Each of the exercises alludes to an operative objective, in such a way that the program internally accumulates the results that the person obtains in relation to a taxonomy of objectives, divided into three blocks and several areas, which are shown in table 1.



Figure 3. Text presentation screen together with vocabulary support.

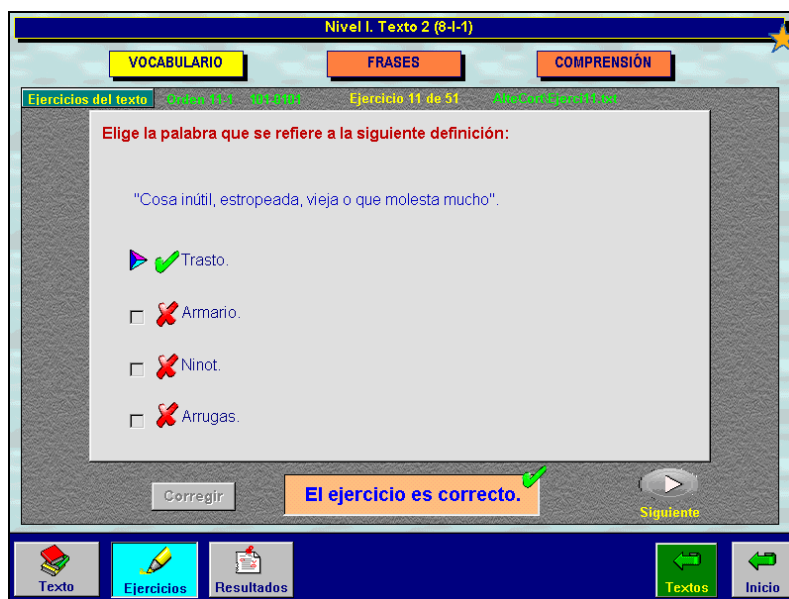


Figure 4. Example of corrected training and practice exercise related to lexical semantic aspects

- A summary exercise. We believe, in accordance with Ramspott (1994), that the summary has a double role: on the one hand it is an instrument of practice that makes for improvement of reading comprehension, and on the other it is an invaluable aid as an evaluation system for reading comprehension, a source of information for whoever needs to know which aspects to intervene on in the comprehension process, both of a linguistic

and cognitive nature, in relation to the selection and organisation of ideas. The summary is considered in this double way within the program.

BLOCK I. LEXICAL-SEMANTIC ASPECTS
Meaning of Content Words
Semantic Relationships
Composite Words
Verbal Periphrasis
BLOCK II. MORPHO-SYNTACTICAL ASPECTS
Use of prefixes and suffixes
Use of determinants
Use of pronouns
Use of prepositions and conjunctions
Use of gender and number
Use of verbs
BLOCK III. ASPECTS RELATIVE TO THE COMPREHENSION OF THE TEXT
Comprehension of the text's central idea
The meaning of details of a text
The structure of the texts
The theses or points of view

Table 1: Relationship of blocks and areas to which the training and practice exercises allude.

- An exercise of inference in which the answer to a question is posed which obliges one to transcend the text information, and which in turn permits us to get to the "situated comprehension" of the text, which goes beyond the representation of information present in an explicit way.
- A summary of results which permits the learner to quantitatively situate his or her evolution in relation to the three generic blocks of exercises both for the text being worked on, and for the group of texts completed up to the current moment.
- An exclusive module for the tutor in which he or she may consult the texts and exercises, and the results of all the learners.

In this second phase the students continue benefiting from a tutor, but in this case his or her functions are limited to resolving difficulties that they may have in their interaction with the computer program, as well as carrying out the follow up and evaluation based on the results of the results of the training and practice exercises; and in the elaboration of summaries and inferences.

3. Evaluation of the candidates.

After the diffusion carried out by the University Counselling Service for Students with Disabilities and the Deaf Persons Federation of the Valencian Community (FESORD-CV) about the initiation of the LEECOM application within the MÀS project, a process of prior evaluation was carried out on 37 persons, ascertaining information on various aspects:

- Through a preliminary protocol of information, collected by means of an individual interview with the candidates, in which they were asked about degree and moment of auditory loss, the preferred mode of communication (sign language or oral language) and the perceived dominion thereof, as well as the use of lip-reading and auditory prostheses if used.
- Intellectual competence. Whilst not being a determining factor, intelligence is an element implied in the reasoning processes, which tasks such as reading comprehension require. In this case we decided to rely on data about intellectual capacity without using verbal information, by means of the Test of Non Verbal Intelligence-II (Brown, Sherbenou y Johnsen, 1995).
- The level of receptive vocabulary in oral language by means of the Peabody Test (Dunn, 1986) in order to have a rather more objective indicator than mere individual subjective appreciation based on the preliminary information protocol.
- Various tests directly related to skills implied in the reading process:
 - o An adaptation of the part of the PROLEC-SE test (Ramos y Cuetos, 1999) concerning the evaluation of lexical processes, developed for its application via computer. A list of 20 words and 20 pseudo-words is presented in random order, and the person to be evaluated is given a decision-making task in which he or she must decide if the stimulus is or is not a real existing word. The percentage of correct answers and time taken to make decisions are taken into account in order to evaluate the efficiency of lexical and phonological routes.
 - o An evaluation of syntactical dominance by means of a drawing - sentence matching task involving 24 items taken from the previously cited PROLEC-SE test.
 - o A cloze test elaborated *ad hoc* from a level I text rejected from the first version of SIMICOLE ("La Horchata"). It must be borne in mind that these kind of tests allow us to establish the reading ease of a given text ("readability") for a given person. Thus, in

accordance with Bormuth (1965), if a subject scores less than 38% of correct answers, the text is too difficult for his or her reading capacity whilst a score of 50% means that the person can work with the text independently. The results of this test allow us to gauge the level of risk in relation to the frustration we must accept when we place deaf people in front of the texts presented by the computer program.

- A reading comprehension test based on the adaptation of texts taken from PLC (Progressive Linguistic Complexity) by Allende, Condemarin and Milicic (1997). Specifically, text IV-A-2 (9 years) of 197 words was applied, evaluating comprehension by means of seven questions each with three alternatives.
- The summary of a text taken from the first version of SIMICOLE ("Patriots in the Caribbean") which was taken both in written form and in SSL via a recording subsequently transcribed in the case of SSL users. Both in passing from one level of difficulty to another in SIMICOLE-2002 and at the end of the program's application, the user will be asked to produce a new summary under the same conditions (written and sign language production).

It must be borne in mind that the total amount of data given by the different tests, together with the information obtained prior to these, have multiple aims. These are the following:

- a) To help us judge the convenience of introducing more or less support on the part of the tutor throughout the process in order to increase the benefits. This is, for example, the fundamental aim of the qualitative analysis of the summaries completed during the succession of levels.
- b) To confirm the presence of more or less significant advances at the end of the instruction process. The analysis of summaries and the application of a test parallel to the PLC also help us in this objective.
- c) To establish factors that may help us to explain the differences that can be observed in the eventual level of benefit obtained by the users, and to determine the minimum profile necessary for a person to be able to benefit from the instructional actions such as those mentioned here, in accordance with the final results. This is the use of collecting information about the preferred mode of communication, the perceived efficiency in its usage, verifying the intellectual competence (independently of verbal load) and the level of vocabulary, demonstrating the efficiency of processes implied in

lexical access, evaluating the capacity of comprehension of sentences with syntactical variations and applying the CLOZE test.

3.1. Data of interest regarding the preliminary information protocol.

Of the 37 persons evaluated, six were excluded for amply exceeding the linguistic and reading level shown by the rest. The most outstanding results related to the preliminary evaluation of the remaining 31 persons who have initiated their participation in the LEECOM program. are reproduced below.

The said group was made up of 15 men (48.4%) and 16 women (51.6%). Their ages ranged from 16 to 43 years, with an average age of 30 (Sd.=7.3). They all possessed obligatory schooling qualifications: 23 cases as a minimum level, seven had gone on to secondary level studies and only one person had university qualifications, a degree in Fine Arts.

80.6% (25 cases), claimed to have a profound degree of auditory loss. Of these, 14 were deaf from birth and 9 had developed deafness in the first three years of life. Only in two of the cases had deafness been acquired some time after three years old. The remaining 19.4% (6 cases) suffered a severe degree of hearing loss. Of these, 3 have congenital loss and 2 acquired it in the pre-lingual stage, whilst only 1 acquired it after 3 years of age. Hence, with regard to the moment of acquisition, 28 had pre-lingual deafness (17 from birth) and 3 had post-lingual deafness, although still during early stages of language acquisition (between 3 and 6 years).

In their majority the preferred mode of communication was Spanish Sign Language (27 cases -87.1%-), with the remaining 4 cases communicating exclusively through Oral Language (12.9%).

Of the 27 cases who used SSL as their mode of communication, 6 could be considered native SSL users in view of their having other deaf Sign Language users in their families. 14 began to use it prior to 6 years of age, whilst the remaining 7 began to learn it after this time. Given their ages, it must be borne in mind that in the majority of these cases the beginning of school education occurred after the age of six, at which moment they came into contact with other deaf children in special educational centres, favouring familiarity with SSL.

When questioned about their level of knowledge of Sign Language, and also in relation to Oral Language, (from a subjective point of view) the 27 SSL users gave the data reflected in table 2, where it should be pointed out that none of them considered themselves to have a "very good" or "very bad" level in Oral Language, the majority (18 - 66.6%) believed themselves to have

reached a "fair" level, 8 (29.6%) claimed to have a "good" level and only one case (3.7%) thought him or herself to have a "bad" level in Oral Language.

Level in Sign Language	Level in Oral Language									
	Very good		Good		Fair		Bad		Very bad	
	n°	%	n°	%	n°	%	n°	%	n°	%
Very good	0	0	7	25.9	11	40.7	0	0	0	0
Good	0	0	1	3.7	7	25.9	1	3.7	0	0
Fair	0	0	0	0	0	0	0	0	0	0
Bad	0	0	0	0	0	0	0	0	0	0
Very bad	0	0	0	0	0	0	0	0	0	0

Table 2. Perceived level of knowledge in Sign Language and Oral Language in SSL users.

These are obviously not people completely cut off from the use of oral language given their social environment. Accordingly, 1 of the 27 persons (3.7%) claims to use oral language "a lot", 11 (44.4%) use it "quite a lot", 14 (51.9%) claim to use it "sometimes" and only 1 (3.7%) claimed never to use it at all.

With respect to the possibilities of oral language use, we should notice that only one case out of the 27 claims to obtain "quite a lot" of benefit from the perception of oral language through the use of auditory prostheses, and in three cases "some" benefit. The rest do not believe they obtain any results from the use of auditory prostheses, and, in fact, 20 (74.1%) never use them. Neither does lip-reading help them very much in improving their knowledge of oral language: in 44.4% (12 of the 27) it helps them "a lot" or "quite a lot", whilst for the other 15 (55.5%) it does not provide sufficient help.

Logically, the four deaf persons selected who only use oral language as a mode of communication claim to use it "a lot". In terms of their perceived dominion, one person believes him or herself to have a "very good" level whilst the other three simply stated "good". None of them believed themselves to have an in some way deficient level of oral language, which would be more congruent with the valuations obtained in relation to their reading ability. Two of them always use hearing aids, considering them to be a great help in the perception of oral language, whilst lip-reading is also of great value to them. For their part, the other two persons do not obtain benefit from the use of auditory prostheses and one of them believes that lip-reading helps "a lot" while the other claims that it helps "quite a lot" in the understanding of oral language.

Thus, from amongst the 31 cases selected we can differentiate two, small sub-groups, unequal in terms of number, quite different with respect to their preferred mode of

communication and in their familiarity with, and benefit obtained from oral language, an aspect to which we have given special attention in this preliminary protocol owing to its close relationship with reading ability.

3.2. Data concerning intellectual competence and vocabulary level.

Insofar as intellectual competence is concerned, the distribution of the 31 persons is fairly homogeneous. With the exception of one case which obtained a percentile of 20, the rest are distributed in a proportional way as can be seen in table 3.

	Frequency	%	accumulated %
Below 25	1	3.2	3.2
Between 26-50	10	32.3	35.5
Between 51-75	10	32.3	67.7
Between 76-99	10	32.3	100.0

Table 3. Distribution of cases according to the percentile obtained in TONI-II

With regard to the level of receptive vocabulary, the group selected has vocabulary ages which oscillate between 6.9 and 12.09 years. The average is 9 years and 1 month, with a standard deviation of 1.7. Table 4 gives us data about how the group is distributed, according to the school level, corresponding to the aforementioned scores. Hence, all cases except one (96.8%) fail to reach the vocabulary level shown by secondary students, that is, ages above 12 years.

	Frequency	%	accumulated %
1 st year primary (6-7 yrs)	11	35.5	35.5
2 nd year primary (8-9 yrs)	10	32.3	67.7
3 rd year primary (10-11 yrs)	9	29.0	96.8
1 st year secondary (12-13 yrs)	1	3.2	100.0

Table 4. Vocabulary level in Oral Language in relation to corresponding school level.

3.3. Data about reading abilities.

Even if the differences in the functioning of the lexical processes are not decisive, there exists a generalised consensus amongst researchers that it is always convenient to consider them when investigating reading comprehension. It is for this reason that we have included the evaluation of these kinds of processes.

For want of other contrastive data, we shall present the averages for the group of six persons excluded following the prior evaluation, with the aim of orientating the analysis of the group selected (see table 5). In comparing the two, both recognition of words and the time taken to make such a recognition is better in the case of the excluded group, although the differences are only significant from the statistical point of view for the percentage of recognition, not for the time aspect. The same occurs in the case of recognition of pseudo-words although in this case the differences in the percentage of right answers are lesser.

	Admitted				Excluded			
	Min.	Max.	Ave.	Sd.	Min.	Max.	Ave.	Sd.
% Words	40	100	77.9	14.5	95	100	98.3	2.6
T. Reaction Words	.73	3.57	1.7	.7	.66	2.24	1.2	.6
% Pseudo Words	75	100	92.6	7.8	95	100	99.2	2.0
T. Reaction Pseudo Words	.73	7.42	2.6	1.3	1.02	4.01	2.0	1.2

Table 5. Results of evaluation of processes of lexical access.

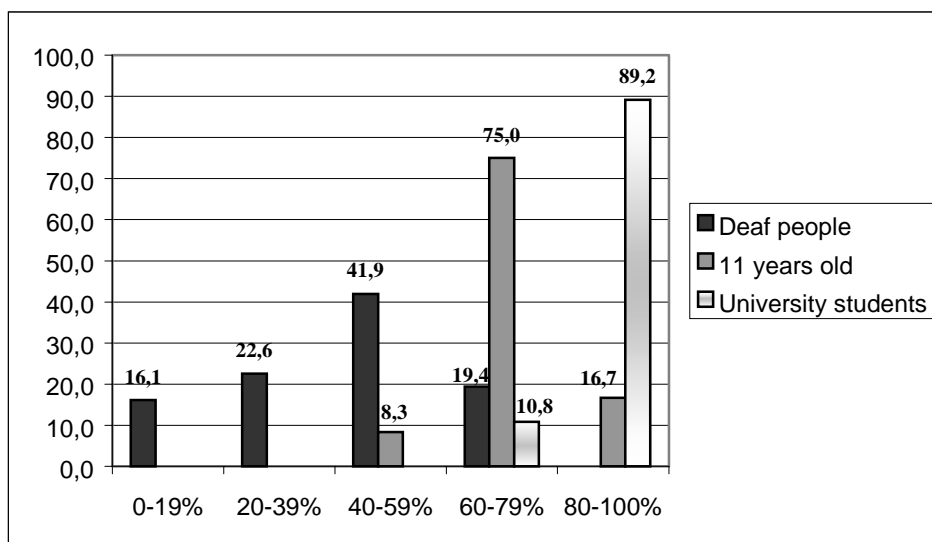
Looking exclusively at the group of selected cases it is surprising to observe a higher percentage of recognition in the case of pseudo-words than words, an inverse result that tends to be observed in hearing groups, even when composed of students showing deficiencies in relation to their reading ability. These kinds of findings help us to anticipate the severe difficulties that this type of population may have with reading by making an objective out of their low competence to recognise words as such. This fact impedes a lack of automation of the lexical processes which increases the consumption of attention related resources dedicated to these levels to the detriment of the higher level processes.

% Correct answers	Frequency	%	accumulated %
From 0 to 19%	11	35.5	35,5
From 20 to 39%	10	32.3	67,7
From 40 to 59%	2	6.5	74,2
From 60 to 79%	6	19.4	93,5
From 80 to 100%	2	6.5	100,0

Table 6. Percentage of correct answers in Prolec-SE (Syntax).

Thus, going up the levels we find that only two of the cases (with a large consumption of time) are capable of exceeding 80% of correct answers, i.e. more than 19 correct answers out of a total 24 in relation to the syntactical test. 74,2 % of the subjects did not score more than half the correct answers in the test (12 items).

Taking as our point of reference the scale established for hearing school pupils at the end of primary school level (11 years of age), we find that this 74.2 % of the group would obtain a percentile of less than 5, with only 3 cases (9.7%) obtaining more than 50.



Graph 1. Percentage of correct answers in the cloze test. Text difficulty level 1.

With respect to the cloze test, we have additional previous data that can help us compare the performance of the selected group with a group of 24 school pupils in the 6th year of primary school with an average age of 11 years, and one composed of 37 first year university students with an average age of 20 years. We must underline the fact that only 19.4% of deaf people would manage to reach the level which characterises children of normal hearing in the final year of primary education. More than a third of the deaf persons (38.7%) selected would obtain correct answer levels of less than 39%, which according to Bormuth's opinion (*op. cit.*) leads us to think that the texts of least difficulty in the computer program would be excessively difficult for them.

In relation to the text directly linked to reading comprehension (designed for hearing children of 9 years of age), nobody in the group is capable of reaching the maximum level of points, and only 12 cases (38.7%) would successfully answer more than half the questions.

Score	Frequency	%	accumulated %
0	1	3.2	3.2
1	3	9.7	12.9
2	6	19.4	32.3
3	9	29.0	61.3
4	9	29.0	90.3

5	3	9.7	100.0
6	0	0.0	
7	0	0.0	

Table 7. Points score in the PLC test (Possible points range from 0 to 7).

Finally, in relation to the production of the summary, the qualitative analysis of the work turned out puts in contrast the difficulties that this task presents for deaf people. Excepting the inter-individual differences, the majority demonstrate a lack of strategies for analysis and synthesis of the text. They set too much store by the details, in many cases easier to understand, which are upheld as the most important ideas although they contribute little to the central idea of the text. They find the extraction and establishment of relationships between the main ideas extremely complex, a fact also made obvious when analysing the assigned summary in which instead of selecting the most relevant information and presenting it in a resumed fashion, there is a tendency to reproduce the text's content in its totality, with evident confusion on many occasions owing to difficulties in the comprehension of the lexis included. Similarly, little ability is demonstrated in making use of the structural markers in the text to help in the construction of its meaning.

A group of 31 deaf persons have thus begun to use the program application LEECOM whose reading processes, as was to be expected, are located around levels even inferior to those shown by hearing pupils in the last year of primary school, i.e. pupils aged 10-11. At the time of writing, (July 2002) the members of the selected group are working within the PHASE 2 via computer aided learning through SIMICOLE 2002. It is hoped to conclude the instruction program and have the definitive results around the months of November and December 2002.

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