

# THE ACQUISITION OF L2 ENGLISH THROUGH COGNITIVE STRATEGIES AND PROBLEM SOLVING

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**Abstract** – This work analyzes how Italian students learn and manage their L2 English skills in Specialized Discourse and general language. In particular, their cognitive strategies of meaning construction through problem solving and sensemaking are investigated through the Think-Aloud Technique. The strategic behaviour is meant as a competence necessary to overcome the difficulties due to the incomplete linguistic competence and learners need to be aware of its use to fulfil communicative tasks.

**Keywords:** L2 English, cognitive strategies, meaning construction, think-aloud, problem solving.

## 1 Introduction

In this paper, I will look at how students who are proficient in Specialized English Discourse use their competences in L2 English as a "general language" together with linguistic and non-linguistic devices to reach the level of communicative competence necessary to fulfil their communicative intents. This aspect needs particular consideration, as pointed out by Gotti (1992, p. 4), who argues that the development of general language is as important as that of Specialized Language because, as professionals, the students will be involved in unpredictable interactions and will not always be focused on their specialized subjects.

The above mentioned non-linguistic devices consist of the strategies used by learners to communicate effectively, even if their linguistic competence is incomplete or partial. The analysis of these strategies, identified through the use of the taxonomy here attached (see Table 1), allows identification of a pattern of problem solving concerning linguistic deficiencies at various levels. As for the development of the learners' autonomy, it is important to identify those strategies and to try to teach them along with the language itself, because as Cohen pointed out, strategies can be defined "[...] as learning processes which are consciously selected by the learner" (Cohen 1983, p.10). This study analyses how psychology students at an Italian university learn and handle the syntactic, morphological and textual features of English Specialized Discourse of Psychology along with the general language, which is usually already known, but needs to be practiced and strengthened in all its competences. In particular, the objective of the *cartoon-task* (from which the research data are obtained) is to test the learners' cognitive strategies of meaning construction through *problem solving*, which is the basis of the psychological discourse.

The methodology adopted to collect the research data is the think-aloud technique (Cohen, Hosenfeld 1981; Ericsson, Simon 1984; Pressley, Afflerbach 1995; van Someren, Barnard, Sandberg 1994) which allows for recognition of the mental reasoning needed to complete the task assigned. Moreover, thanks to the taxonomy attached (see Table 1), all strategies adopted by the learners involved are identified in the verbal reports and

discussed to identify a pattern of linguistic and strategic behaviour which would allow not only the language competences assessment, but also the learners' awareness of their communicative strategies.

## 2. Theoretical backgrounds

The students involved in this research were interviewed while attending their English Language course and the data derived were also used to verify if they were able to develop and use a kind of "creative" language. They usually need to bridge the gap between their language knowledge and competences and the needs of a real and spontaneous conversation requiring a register which matches that particular context of situation (Halliday 1984). An English language course focused on Specialized Discourse should be aimed at teaching the linguistic, textual and pragmatic features of the specialized genre and register of the main topics of study as well as the general language. This approach allows the learners to acquire the communicative competence needed to cope with contexts in which a specialized conceptual competence is necessary to understand and produce messages at the ideational level (Halliday 1984). In fact, an individual needs specialized conceptual competence to understand and produce messages at the ideational level (cf. Gotti 1992, p. 3) and the knowledge of linguistic features of the L2 – general and specialized – in order to develop the communicative competences necessary to cope with the specialized contexts.

In Gotti's view (1992, p. 4), the purpose of a course on specialized discourse is to allow the learners to acquire a communicative competence that they can use in professional settings. The aim of the language course should be seen in terms of competence and not of performance. Communicative competence involves the knowledge of linguistic and pragmatic rules and an operative competence. Many scholars have discussed these issues providing their own definitions, therefore contributing to the understanding of the different aspects. Candlin (1987, p. 7) affirms that "our communicative competence is part pragmatic and part cognitive". Canale (1983) grouped these competences as: grammatical, sociolinguistic, discursive, and strategic competence which assists to overcome a lack of knowledge in the L2 and to increase the usefulness of the communication in which an individual is involved. Faerch and Kasper (1983) affirmed that the knowledge of a L2 learner is both declarative and procedural. "Declarative knowledge is 'knowing that', it consists of internalized L2 rules and memorized chunks of language. Procedural knowledge is 'knowing how', it consists of the strategies and procedures employed by the learner to process L2 data for acquisition and for use" (Ellis, 1985, p. 164). Guido (2004, p. 361) defines the procedural knowledge as "the knowledge of how to achieve an illocutionary goal by verbally planning the actualization of the required speech act." Particularly at this 'planning' stage, the sociocultural or ethnic background of the speaker plays a central role in the achievement of the goal. Using L2 knowledge involves a process which consists in production and reception strategies along with communication strategies. In Canale's (1983) view, communication strategies include all the attempts made to increase communicative effectiveness. A communication strategy can also be considered as a plan to fulfil a communication goal. Tarone (1977) maintains that communication strategies are used to overcome a crisis due to a lack in the linguistic competence in the communication of the message. It is interesting to observe that native language speakers use the same type of strategies; the only difference from the strategy

used by non-native speakers is the frequency with which the same strategies occur in their discourse.

Previous research demonstrated that L2 learners develop a language system called *interlanguage* by using input received (Ellis 1985, p. 47). Selinker was the first to use the term "Interlanguage", suggesting that five main processes are involved. These processes are: language transfer, overgeneralization, transfer of training, strategies of L2 learning and strategies of L2 communication (Selinker 1972, p. 27). These processes constitute the ways employed by learners to internalize the L2 system (Ellis 1985). Selinker (1972) also observed another phenomenon in the learning of L2 which he defined as *fossilization*, which is the stagnation that occurs in the L2 learning at a stage when language competence is not complete. The system of acquired rules is different from those of the target language system and even if more input is made available the learner does not transform it into *intake*.

Further interesting instruments are used in linguistic production to manage the different settings of interaction and they can be found in the speech of native speakers as well as non-native ones. These are the linguistic products defined as *formulaic speech* (Lyons 1968, p. 177) and *creative speech* (Ellis 1985, p. 70). "Formulaic speech consists of expressions which are learned as un-analysable wholes and employed in particular occasions" (Lyons 1968). L2 learner's rules thus constitute the interlanguage system and produce creative speech. Faerch and Kasper (1983) assumed that the development process of interlanguage rules and the automatization of interlanguage knowledge involve various strategies. The two scholars (Faerch, Kasper, 1983) identified two processes as strategies used to create interlanguage rules: a) *hypothesis formation* and b) *hypothesis testing*. What is more, they suggested that the hypotheses regarding interlanguage rules are formed in three ways, firstly by using previous linguistic knowledge (such as the L1, existing L2 knowledge or knowledge of other languages), secondly by formation of new rules from the input, and thirdly by them both (Ellis 1985, pp. 170-171).

We will try to identify these interesting types of communicative acts in the oral production of the L2 learners interviewed during this research. This will be done to determine if they manage to deal with the language problems in general English communication in the same way that they usually do in specialized communication through L2 English. Language use and strategies were identified through the think-aloud technique and (Cohen, Hosenfeld 1981; Ericsson, Simon 1984; Pressley, Afflerbach 1995; van Someren, Barnard, Sandberg 1994;) the resulting verbal reports. This method allows us to look at the thought processes involved in the completion of a task when researchers need direct data regarding the on-going processes. "[...] It is possible to apply this technique to psychological and educational research on cognitive processes as well as in knowledge acquisition research. It is also used to study the creative reasoning process" (van Someren, Barnard, Sandberg, 1994, p.1). As for the validity of performances of the task assigned, Ericsson and Simon (1984) affirm that people perform almost in the same way whether or not they provide verbal reports. This method of collecting data may slow down the performance, but not interfere with the task itself. The communicative strategies used by learners will be subject to analysis in order to identify those most used in the various protocols and to draw a pattern of strategic linguistic behaviour typical of a particular group of students (e.g. enrolled in a given undergraduate course) (Giampaolo 2009, p. 163).

### 3. Method

This ethnographic study is founded on data from records of cartoon descriptions made by students. The learners involved in this research are enrolled at the Faculty of Education and attend the undergraduate course in Psychology. From a class of 200 students, 40 were selected to form the sample group. Seeing that only the qualitative aspects were considered and the students' linguistic patterns were almost all the same for the verbal reports, only three performances were reported. Students were recorded while describing out loud a comic strip without text. This "think-aloud" technique (Pressley, Afflerbach, 1995) is used to verbalize the cognitive processes occurring while working on a task, in this case students were recorded in the presence of their professor who gave instructions about the modality of the task performance and, in order to avoid time pressure, they were given as much time as they needed to complete their description. In fact, according to Ericsson and Simon (1984), this type of procedure can slow the primary task which is the description of the cartoon (although it doesn't interfere with it). In particular, the task proposed aimed to increase the learners' cognitive skills by concentrating on the psychological processes through which it is possible to associate a meaning to the behaviour of the cartoon characters. All the students interviewed were at an intermediate level – (B1 of the CEF) of the English Course of the Academic Year 2011-2012 – and had already passed their English exam. They were individually and voluntary interviewed and recorded in a linguistic laboratory for the period of June 2012 to September 2012. The recordings started after the English Course lessons to give students the possibility to familiarize themselves with their professor and to lower their level of anxiety. The main reason for using verbal report protocols is that it makes it possible to obtain detailed information while the subject is performing his or her task, information that would otherwise be lost to the investigator (Ericsson, Simon 1984). It has been demonstrated that verbal reports, well prompted and interpreted, are an effective source of information regarding cognitive processes (Ericsson, Simon 1984; Pressley, Afflerbach 1995).

The think-aloud method and the resulting verbal reports highlight the learner's critical areas of language acquisition and use. By matching the various recordings, we are given a chance to find common patterns of language use which is useful to trace hypotheses of language teaching and reinforcement in order to avoid fossilization. In particular, once the errors that hinder communication have been identified, it is possible to use this feedback to strengthen the weak language structures through methods that fit a particular learning situation. By doing so, learners are assisted in identifying and being aware of their own strategies when communicating by using their knowledge to produce a "creative language" Furthermore, verbal reports could provide individual pre-examination feedback on oral performances, which are otherwise difficult to obtain in crowded university courses attended by learners coming from very heterogeneous learning backgrounds.

The pictures below were shown to the students involved in this survey. During the recordings only the researcher was present and before starting the students received instructions explaining the task.

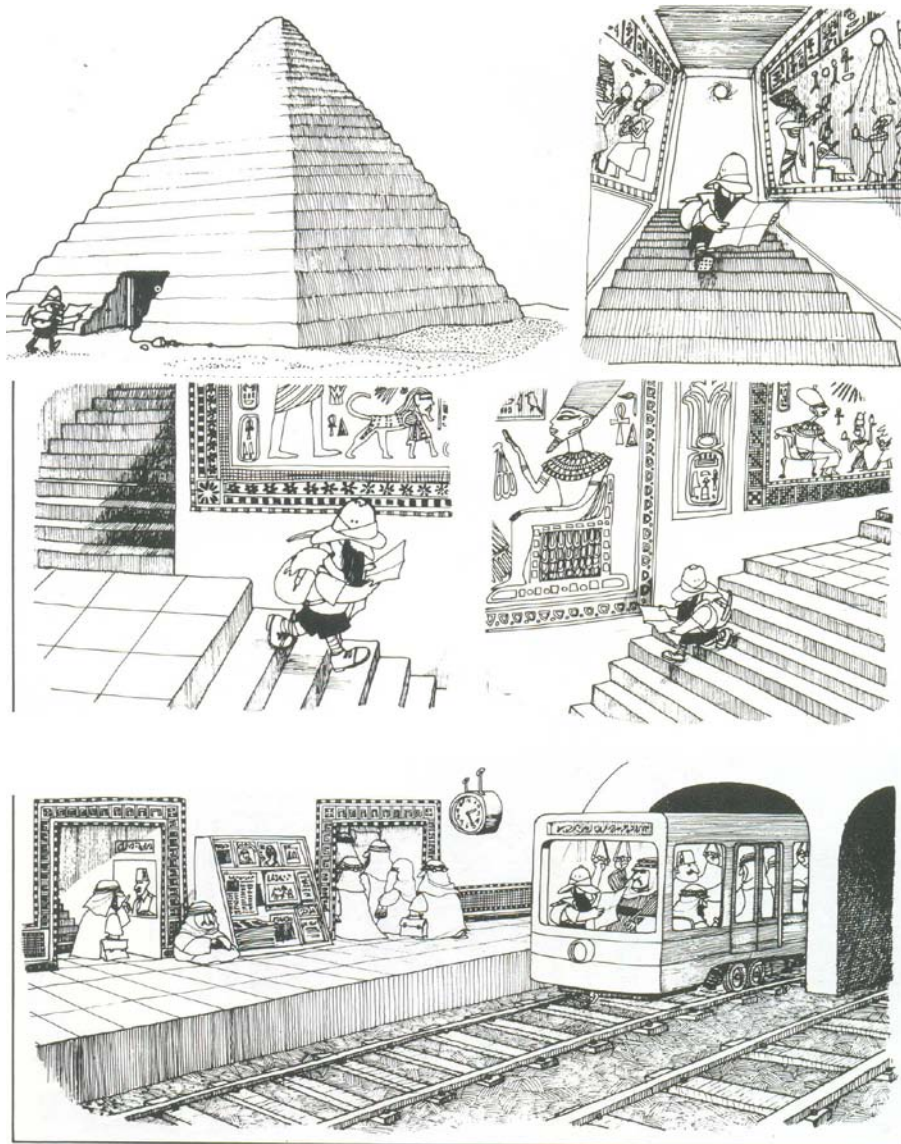


Figure 1 (Quino 1993, p. 15)

The protocol data obtained from the transcription of the students' recordings were analysed (see section 3), providing coded interpretation and material for a discussion of the strategies used by students in order to fulfil their communicative intents. Particular care was given to the analysis of the existing knowledge used to communicate a concept which is well recognized and understood at the ideational level by learners, but which is difficult to express in L2 because of their lack of linguistic competence.

## 4. Analysis

### 4.1. Transcription 1

(S: Student; P: Professor); each sign “+” indicates five second of empty pause.

S: Uhm ++ There is an *Egypt* ++ a pyramid +++ there is a man with a ++ pick, *He seems, I think*, he is an *explorator* ++ and he has a ++ a

P: *backpack*

S: *backpack*, yes, eh ++ he is going *versus* ++ the *door* and he *continuous* to go *down the stairs* and he look at his *paper*, he has a *paper* in his hands and is ++ + and *continue* to go down the stairs and there are *Egyptian* ++ *design*??

P: *drawings*

S: *drawings*, yes, and he *arrive* in a metro station, *I suppose*, he *confuse* the metro station with a pyramid to explore.

#### 4.1.1. Protocol analysis:

The first student interviewed begins his description with a pause *uhm*, this *uhm* can be considered as a filler used to take the turn of conversation and hold the channel of communication open during the hypothesis formation about the picture content. This student uses the word *Egypt* to indicate the building in the picture and he self-corrects with the word *pyramid*. He uses the chunks (or unanalysed forms) *he seems* and *I suppose* which are typical features of the "think aloud" technique. This is a way to communicate not only his insecurity about his interpretation of the strip, but also that he is forming his conceptual hypothesis, trying to understand the meaning of the pictures in order to provide the correct interpretation of them and his hypothesis about the correct lexical items he needs in order to verbalize his concepts. The student uses various strategies to complete the task assigned. He asks for the professor's assistance through various indirect appeals for help, and turns to his existing knowledge, in particular, the Latinate word *versus* to indicate the direction of the man in the picture. The word *continuous* used to indicate that the man is going on is an L1 transfer, because in English it is used in different contexts. The word *explorator* used instead of *explorer* is an L1 transfer at lexical level. There is the use of the superordinate *paper* to indicate the map (hyponym) in the hands of the explorer. Blum and Levenston (1978) considered the use of a superordinate in cases like this as a simplification. This student uses the words *Egyptian design* to indicate the hieroglyphic but turns to the professor for assistance with the word *design*, repeating the prompt *drawings* offered. This transcription presents a number of omissions of the suffix *-s* for the third person of the present tense, typical fossilization of Italian speakers of English as an L2. An important feature of this transcription is the presence of the *problem solving* (complete the task assigned) and the *sense making* (Salvatore, Venuleo 2008) to understand the meaning of the comic strip with the use of hypothesis formation at the ideational level (Halliday 1984).

#### 4.2. Transcription 2

S: Ehh ++ allora ++ there is a picture with a man in the sun and a pyramid and the man is going inside the pyramid. Uhm ++ + Ehhhh ++ Heeee is ++ he go ??

P: Downstairs

S: Down ++ + stairs eh++ +he *read* a ++map and I see again the sun and *gieroglyphic* ?? *Egyptian writings* on the wall and he *go* again eh ++ down and there are many Egyptian writings and then there is a *tube* station and there are *Arabic* men with local dresses and there is a newspaper shop and a ++train and the *explorator* is now a passenger ++he is now *in* the train. But maybe he is not an *explorator*, he is always reading his map, but I don't know if it is a map. Maybe he *go* ++ *goes* by train every day and it is normal because he is *uhm*??

P: uninterested

S: Uhm, yes, uninterested.

#### 4.2.1. Protocol analysis:

The second student begins his report with the use of fillers and the use of an L1 transfer (*allora*) during his hypothesis formation process at both lexical and conceptual levels. He uses the indirect appeal for help for the word *downstairs* and repeats the prompt dividing the compound words into two morphemes. In this verbal report, we find the use of an L1 transfer at pronunciation level for the word *hieroglyphic* (spelled *gieroglyphic*) and immediately after its explanation through paraphrase in *Egyptian writings*. The use of a paraphrase was defined by Tarone (1977, p. 198) as "the rewording of a message in an alternate acceptable target language construction, in situations where the appropriate form or construction is not known or not yet stable". We can affirm that, in this case, the student was not sure about the correctness or intelligibility of the word used, so he rephrased his thought. The use of the word *Tube*, as Londoners call the underground, is a cultural transfer from the existing knowledge but can be also considered as a compensatory strategy (Bialystok 1990; Canale, Swain 1980; Canale 1983; Dörnyei, Scott 1997; Ellis 1985; Giampaolo 2008) to give the impression that he is able to handle the L2 using a specific word. This report presents the use of the adjective *Arabic*, which is the term used to indicate the language, instead of *Arab* which indicates the individual. We find again the L1 lexical transfer of the word *explorator* instead of *explorer* as for the first verbal report of this survey. The student uses a positive reformulation when he self-corrects one of his usual mistakes of *-s* suffix dropping (*go* + *goes*).

#### 4.3. Transcription 3

S: Uhm ++ +I ++ There is a ++ a Egyptian building eh ++ a pyramid?? Eh + there is a man that ++ *going* eh ++ *on the stairs* with ee +++ *cartina*??

P: Map

S: Map ++ and he *go* down and down again and there are *Egyptian drawings* and when he *arrive* there is a train and there is a train station, a metro and the man is on the train and, *I imagine*, he is not an explorer but he always uses the metro.

#### 4.3.1. Protocol analysis:

The third student starts his report trying to find the correct word to define the pyramid. He uses the definition *Egyptian building*, but he soon changes it into pyramid, even if he is not sure, in fact he uses a rising intonation to elicit feedback from the professor. We find various *-s* suffix dropping (for the third person of present tense as well as the dropping of the auxiliary verb in the present continuous (*is*) *going*). This student uses the form *on the stairs* unlike the first two who used the right form *downstairs*. An interlocutor could misinterpret this error at conceptual level because of the gap of information regarding position in the space of the explorer (Lakoff, Johnson, 1980). There is a direct appeal for help with the use of the L1 (*cartina*??) and the rising intonation is used again to ask the English for that word. The use of the superordinate or general word *train* is soon replaced by the word *metro*, an L1 transfer. In the last part of the report this student gives his own interpretation of the strip, introducing his conceptual hypothesis with the phrase *I imagine*. The communicative strategies adopted were identified through the use of the taxonomy below (table 1):

Strategy	Description	Example	Other Taxonomies
Message abandonment	The message is left incomplete due to difficulties	There is a...	T, F&K, W, D&S
Self-reparation	Self-correction of statements	There i san Egypt...a pyramid	W, D&S
Direct appeal for help	Explicitly asking assistance from the interviewer	Cartina??	T, F&K, W, D&S
Indirect appeal for help	Indirectly asking for help from the interviewer, verbally and nonverbally	He has a++	T, F&K, W, D&S
Self-Repetition	Repeating a word or phrase immediately after having pronounced it	He go++goes	T&Y, D&S
Repetition of others	Repeats a word or phrase spoken by the interlocutor	Down++stairs	D&S
L1 use or existing knowledge	Using mother tongue words and terms while communicating in L2	Allora... Versus	
Literal Translation	Literal translation of a lexical element, a structure or structures composed by L1/L3 in L2	Explorator	T, W, N, F&K, P, B.
Vowel lengthening	Extending the duration of the vowel sound midway or at the end of the vowel	Heeee	
Reformulation	Rephrasing of an element that is uncertain, the reformulation is not always correct	There are...thes are...	
Use of fillers	The use of open or filled pauses in order to gain time and keep the communication channel open	Uhhh, Ehhh	D&S
Omissions	Avoids the problematic element and continues as if it had been pronounced	They look quite...some people are...	D&S

Table 1

Taxonomy. (Prepared by M.T. Giampaolo, based on the taxonomy of Dörnyei, Scott 1997. Abbreviations in the taxonomies indicate the names of other researchers who have identified the same strategy, namely; Tarone; F&K: Faerch, Kasper; B: Bialystok; P: Paribakht; W: Willems; N: Nijmegen Group; D&S: Dörnyei, Scott).

By analysing the survey data it is possible to affirm that learners who are good at speaking and reading in English about their own area of study, also demonstrate competence in the use of the L2 as general language and, in these verbal reports, they use their competences



in *problem solving* to fulfil their task. During the description of the comic strips administered to them, students of English from the undergraduate Course of Psychology show a good competence in the use of the general lexis, grammar rules and verb forms, even if they produce the commonly-found errors such as the lack of the suffix -s for the third person singular of the simple present and for the plurals of nouns. This form of *fossilization* is typical of Italian learners of English as L2. All the students recorded used paraphrase when they weren't sure of the correct lexical items required (Tarone 1977, p. 198).

The use of existing knowledge is an important example of the way in which students manage their lack of knowledge in the L2. In this study, existing knowledge was used to bridge the gaps at the lexical level, using words as *versus* and *continuous* deriving from the knowledge of Latinate words by Italian students, but also at the cultural level when one of the students uses the word *Tube*. During their descriptions the students rapidly appealed to their language competences or existing knowledge, and demonstrated creativity in finding solutions to their linguistic shortcomings and activated their skills in *problem solving*, *prediction* and *sense making* to complete their tasks. The use of these non-linguistic skills is a distinctive feature of this group of Psychology students. For these students, the "*think-aloud*" technique represents a method to fulfil their tasks which is to interpret the reality proposed with the help of the tools they have. It is important for them not only to be able to know the lexical items and grammar structures to describe the cartoons, but also to try to understand their meaning through the *hypothesis formation* and *hypothesis testing* at the conceptual level.

## 5. CONCLUSIONS

By analysing these verbal reports it is possible to recognize the students' linguistic competences as well as the "strategic behaviour" they display to overcome the difficulties encountered due to their incomplete linguistic competence. When faced with a problem, the students were quick in their decision-making to overcome the predicament, and made appeals for assistance only when they could not find a solution within their existing knowledge. Furthermore, their pattern of reasoning is derived from their main area of study (in this case Psychology), which reveals how the cultural environment influences the perception of reality at conceptual level and, consequently, how it affects the type of learners' language focus (Giampaolo 2009, p. 163).

The learning of a L2 is considered a process in which the learner develops his or her own language system by setting hypothetical norms and checking their effectiveness. Analysing each phase of this process could be useful in planning L2 teaching. In this sense the learners' language use, both correct and erroneous, becomes an indicator of how their competences progress, and it is the most effective means by which researchers and teachers can better understand what a learner is able to do and how he or she does it. Therefore, committed errors are considered indicators of the development of the learners' language which is determined not only by exposure to the language, but also by a creative reasoning about the language itself. Errors are an inevitable feature of learning and reveal the strategies that learners use to learn a language. They provide a valuable insight into the language acquisition process. Learners evolve a system for themselves which is initially much simpler than the system of the language that they are learning. They revise some rules, ignore or simplify language aspects which they encounter through exposure and through the completion of learning tasks. Seen in this light, the language use of L2

learners, including their strategies, provide teachers with an indication of the rules used by the learners at a particular stage of their interlanguage development as well as how the language is acquired by the learners and what linguistic features cause them learning problems.

All the reasons discussed above should induce teachers to systematically analyse their learners' language production in order to understand how to help them in the process of L2 language acquisition. The data drawn by the analysis of the verbal reports are useful to identify problematic areas in the acquisition of the L2 in a particular group of learners. The strategies, especially, which are used to fulfil a task (e.g. compensatory strategies, etc.) are linked to the learning style of each learner and as a consequence they provide teachers with insights useful to the design and improvement of teaching methodologies that fit a particular learning situation. Furthermore, students' awareness of communication strategies would improve their skill in using them to reach the communicative target. The method adopted here, along with the same data, could be used to assess the spoken language not only in its lexical, morphological and textual correctness, but also in its fluency and pronunciation. It is possible to apply this technique also to psychological and educational research as well as in knowledge acquisition research.

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