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# Memory and Language Learning: Working Memory Capacity in Developing Learners' Oral Proficiency

## The case of Third and Fourth Year Students in the Department of English at ENSC

Thesis submitted in Candidacy of the Degree of "Doctorat ES-Science" in Applied Linguistics

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# DEDICATIONS

To my dear parents, for their nature and nurture

To my husband, Taha and my two little princesses, Myrna and Dyna

To my brothers; Fouzy, Mohammed and samy

To my sister Romaissa

To my dear little nephews, Racim, Ilianeand Nael

I appreciate you all

To everyone who has contributed to my education

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## ABSTRACT

The objective of this paper is to highlight the relationship between language acquisition and the human memory system, short term memory in particular, and the eventual contribution of the latter in developing the learners' oral proficiencies. To fulfil those objectives, this workis based on a hypothesis that stipulates that ifstudents' working memory capacity is large enough to contain the needed information, it will allow the momentary retention of a considerable amount of acoustic knowledge, which in its turn would allow a fluent speech production. Besides, this same knowledge would be then internalized and hence permanently kept in a larger store (long term memory) with practise and frequent rehearsals. To consider the extent to which our hypothesis is in the right direction, a non-word repetition test is administered in an attempt to measure EFL learners working memory capacity in the Teacher Training School of Constantine. This test is usually used to show the extent to which people are able to recall sounds, and the more sounds available in the system, the larger the working memory capacity would be (knowing that working memory is the store that is responsible for keeping acoustic information). Next, a questionnaire was used with the basic aim to demonstrate that there is a possible relationship between working memory and long termmemory functions, and how EFL teachers could make good usage of that knowledge in teaching the speaking skill, and hence, helping in improving learners' oral proficiencies. The non-word repetition test confirmed the stated hypothesis since the obtained resultsare statistically significant in that they clearly validate ourprediction that, in fact, working memory capacity influences the development of learners' oral proficiency. Those outcomes are further positively supported through the questionnaire results, throughout which we feel the learners' awareness of the role of the memory system as a whole and working memory capacity in particular in promoting their English language fluency. In addition to that, the learners' answers confirm, somehow, that in addition to the undeniable role of the memory system in developing speech production, a good interaction amongst the learners, an appropriate teacher knowledge presentation and a favourable psychological status of the learner would inevitably lead to achieving the targeted objectives of our stated hypothesis.

# LIST OF ABREVIATIONS

EFL: English as a Foreign Language

L1: First Language

L2: Second Language

LTM: Long Term Memory

NWRT: Non-word repetition test

PPP: Participation, Practice and Production Model

STM: Short Term Memory

VWM: Verbal Working Memory

WM: Working Memory

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## Chapter IV: Measuring EFL Learners Working Memory Capacity

## General Introduction

# General introduction

Human learning is a very complex activity, and learning a foreign language is just one example. For, when we learn, we do not just acquire knowledge. In fact, this is accompanied with an interaction of a number of mental processes, which basically aim at facilitating the knowledge acquisition process. Thus, when confronted with new information, we find ourselves thinking, paying attention, storing, integrating and retrieving knowledge if needed.

Learning is defined as a permanent change in the individual's behaviour due to practice or experience. Learning a foreign language in particular is broadly defined as developing the ability to communicate and interact in the target language. This encompasses the mastery of the four skills, speaking in particular, regarding the nature of any language goal, which is communication.

On the other hand, language learning is a field in educational psychology that has become a central point of study and inquiry in recent decades. In fact, all the available knowledge about the subject is the result of different investigations carried out by eminent researchers and psychologists, the objectives of whom are to clarify the most essential factors contributing to a successful language learning/acquisition. Probably, one of the crucial areas of exploration and analysis, which handled the raised issue, is the one taking into consideration the role of memory in speech production. Ellis (2001:33) argued that the role of memory in language learning has long been of interest in first and second language acquisition. On the other hand, Goldstein (2005:137) reported in his book "Cognitive Psychology" that: "you need memory to keep track of the flow of conversation". Here, the importance of memory while producing speech is

quite apparent, though the interaction between language and memory does not seem very obvious at first. Obviously, this interaction is necessary when trying to lead a conversation properly; especially that memory is by now recognized to be the most essential function behind the mental activities of storing, maintaining and retrieving the information.

A great number of investigations (Baddeley, 1986. Baddeley, Gathercole and Papagno,1998. Gathercole and Masoura,1999) have been carried out in an attempt to illustrate how memory can influence human learning in general, and acquiring a foreign language in particular. Consequently, psychologists provided reviews about memory and its different components contribution; especially that, seemingly, any success in foreign language learning is, by now, essentially attributable to memory capacity. Notions like long term memory, short term/working memory and sensory registers, among too many others, have become common expressions to interpret memory capacity contribution in learning. However, what is observed, as far as foreign language acquisition is concerned, and despite the importance of the whole memory system in language learning, most psychologists' attention is mainly consecrated to short term memory or working memory at the expense of other memory stores. Haastrup (1991:38), for example, believes that information in short term memory is easily accessible compared to the one present in long term memory especially when it comes to producing verbal language.

**1-Statement of the Problem**

Throughout what has been exposed so far, speaking is by now recognized to be crucial while learning a foreign language. In the Higher School of Education in Constantine, it is a subject taught to first, second and third year students in the

department of English. Its objectives are to prepare the learner to get familiar with the different aural aspects of the English language in order that the student would be able to fluently express him/herself when becoming a teacher. However, and despite all the efforts spent to effectively teach speaking (availability of sophisticated and well equipped laboratories as well as trained teachers in the field) and thus to facilitate its acquisition, it is believed that learners still have serious problems in producing speech(fluency). This observation, which the researcher herself discerned while conducting a descriptive study in 2005/2006 leading to a magistère degree in an attempt to identify some factors leading to failure in developing the learners' oral proficiency, will constitute the main framework of the present study. At that time, non-fluency was attributed to some psychological factors like field dependency, introversion, inhibition, empathy, apathy, anxiety, aversion….

In the present research, however, we presume that failure in developing the oral proficiency is attributable to a purely cognitive factor, particularly the learners' working memory capacity. It is believed that neither teachers nor learners are aware of the role of the memory system as a whole in enhancing speech production.

**2-Aim of the Study**

The main aim of the present research is to provide, first a general interpretation of the role of the memory system, with all its components, in the improvement of ones' language acquisition. Second, it attempts to clarify the eventual interaction between speech production and working memory capacity, highlighting at the same time,as far as possible, the exact and accurate contribution of the different components of the system in developing foreign language learners' oral proficiency. Finally, it purports to

show that, overall, the prediction that working memory capacity would influence positively learners' oral proficiency can be empirically proved to be true.

**3-Research Questions and Hypothesis**

As already mentioned, the purpose of this study is to gain understanding and information about the pre-assumed relationship between short term memory and speaking. Thus, to achieve the target objective, specific questions were put, which would constitute the main framework of the present study**.**

1-To what extent does memory influence language learning promotion?

2-How could short term memory capacity be linked to foreign language fluency?

3-How exactly different kinds of memories (information) are stored in the memory system, and what are the direct causes of forgetting?

Answering these questions, in fact, can stand as one way out of the conflict related to the issue of which memory store is behind speech production. Besides, it may contribute to finding learning methods and techniques of how to make good usage of those findings aiming at enhancing foreign language learners' oral proficiency. It would appear that to learn effectively, an active memory capacity is needed, and in considering this issue, stress is put on the different memory systems and more particularly on working memory and its hypothesized crucial contribution to oral proficiency.

Basing ourselves on the above research questions, it is hypothesized that learners' oral proficiency development would be largely due to the availability and accessibility of acoustic knowledge kept in their working memory store, i.e**, if students**

**working memory capacity is large enough to contain the needed information, it would allow the momentary retention of a considerable amount of acoustic knowledge, which in its turn would allow a fluent speech production.**It can be said that the knowledge thus acquired would be then internalized and hence permanently kept in a larger store (long term memory) with practice and frequent rehearsals.

## 4-Research Methodology

In educational research, the adequate choice of the method that would be adopted is a significant factor that would inevitably facilitate the successful completion of any type of research work. Hence, to choose the more appropriate method, different criteria were considered like the nature of the issue, the population involved, and the kind of data required.

The method that would be used to discuss the different issues of the present study would involve appropriate tools of research which require quantitative and qualitative analysis of the data, which will be collected to implement the present research (c.f data gathering tools).In that respect, we are going to use an experimental design, a non-word repetition test designed to measure the extent to which subjects can repeat non-sense words and whether or not they can temporarily store the phonological information, thus linking it to verbal working memory. Besides, a questionnaire is used as a descriptive tool to get some insights on learners' understanding on the important role of working memory in developing the learners' oral proficiency. (c.f section **4.3** for more details). Throughout this work, we might end up by contributing to an already established psychological model, or bringing new data which will aim to the establishment of a new model, if the hypothesis will be repeatedly confirmed.

## 4.1-The Population

The population of interest in the present research arethird and fourth year students in the Teacher Training School of Constantine (45 students in the pilot study and 131 students in the main study. As for the questionnaire part, the population will include 134 students). Having already been introduced to the university language learning context, they must have shown the targeted issues, “memory, in particular”, throughout their English learning process. It is believed that this situation will help us to compare, test and evaluate the different ways different students develop and make sense of their language learning through using different learning strategies-memory strategies in particular-and thus, contributing to confirming our already stated research questions and hypothesis or the opposite.

## 4.2--Sampling

Sampling is done randomly, since it is about testing a set of individuals chosen from a larger population. Generally speaking, a sample, in the human and social sciences, is usually about 1/5 of the whole population. Random sampling is a probabilistic technique which will give to each member of the target population an equal chance with all the others to be selected. Thus, a sample of 131students was randomly selected from a population of 220 students at the ENSC in the academic year 2013/2014.Random sampling allows an appropriate and adequate statistical technique to the fulfilment of this research. In fact, there are many other techniques in sampling like the proportionate stratification technique which is mainly based on the selection of individuals in accordance with their social class, age, sex, ethnic group and so forth. However, these characteristics, which are mostly needed in sociological research, are of

less importance in this case, a psycholinguistics type of study at the junction of cognitive psychology, education and linguistics.

### 4.3-Data Gathering Tools

After précising the population that would be involved in that study, we have to clarify the type of data gathering tools that would suit it and allow an easy access to their opinions, personal conception and perception about our issue. In fact, it would be quite reasonable to take these facts into account when choosing those means to fulfil the aim of the study. Thus, the means of data collection that would be used are questionnaires, self-reports, interviews and observation. Observation is of relevant importance, since, and considering the nature of this work, it is the best tool that allows the detection ofthe learner'sdifferent behaviours and reactions to our recommendations, and the interpretation of which would be revealing and imperative to meet the purposes of the present research.

In addition to that, and regarding the targeted issue of the study related to working memory capacity measurement, a non-word repetition test is usedto fulfil those objectives. It is a kind of test basically aiming at measuring working memory capacity and primarily consisting of providing learners with a list of meaningless words to be rehearsed and then orally reproduced. The number of words kept in the memory system would reflect learners' own working memory capacity. (More details are provided in the fieldwork)

**5-Structure of the Dissertation**

The thesis is divided into two parts, the first of which includes three chapters dealing respectively with a theoretical review related to speaking, long term memory, short term memory and sensory registers.

The Second part deals with the fieldwork, which is divided into two chapters. The first one is an analysis of the experimentation conducted with the purpose of meeting the objectives of our research questions and hypothesis. The second chapter, however, deals with the questionnaire's answers analysis as perceived by the targeted population of the Teacher Training School of Constantine. The attempt here is to examine through other tools (questionnaire, observation, interviews) the results of the experimentation, as well as creating a link between theory and practice.

Finally, we present some recommendations and pedagogical implications are presented in an English language classroom. It suggests some techniques about how to conduct research about working memory in relation to learners' oral proficiency in the classroom.

# Chapter I: Speaking

## Chapter I: Speaking

## Introduction

Learning a foreign language requires the mastery of its different aspects: aural (speaking and listening) and graphic (writing and reading). This implies the idea that for a better language acquisition, the four skills are to be given much importance and consideration. Since the practical focus of the present chapter is about speaking, what follows would reflect some rhetoric knowledge background about the subject in question. Thus, a definition is provided to speaking in a try to cover its different areas of interest, and highlight the relevance of different cognitive processes to develop the learner's oral proficiency.

The objective of that chapter is therefore to consider ways of making sense of that knowledge to develop the learner's speaking skill. In fact, from a linguistic point of view, we could have considered aspects like factors contributing to the fulfilment of that enterprise, like the mastery of the grammatical and phonological rules, highlighting at the same time the extent to which they could be relevant to the improvement of speech production. However, from a psycholinguistic point of view, which is our targeted scope, we will consider some particular functions of the brain different systems, working memory in particular, and how students process that knowledge to produce a fluent and accurate language.

Thus, by the end of this chapter, a foreign language learner would be able to understand and appropriately define what speaking is, distinguish between the different aspects of speaking, and more importantly understanding how working memory processes the acquired knowledge to produce speech.

## 1.1-Definition of Speaking

To know everything about speaking, we need to expose the most widespread definitions of the subject matter proposed by specialists in the field. From a lexical point of view, a quick search in the Webster's Universal Dictionary and Thesaurus provides a definition to speaking as follows: "it is to utter words; to talk or to converse with some body, or to produce a characteristic sound" (1993:497).From a psycholinguistic point of view, however, Shanney (1997:13) believes speaking to be the use of different kinds of verbal and nonverbal systems to communicate and share meaning with others in different context. As for Brown (1994:103), speaking is meant to be a skill responsible for oral language production that needs at least the presence of two people to communicate and exchange knowledge in order to maintain social relationships. Nunan (2003:48), highlighted that speaking is still a speech production skill but which is responsible for formulating verbal utterances to transfer meaningful messages.

From the above statements and definitions, one may deduce that the concept is about using speech to convey different kinds of information, or in other words, speaking implies the idea of an aural production of well-organised verbal utterances, the objective of which is to interact. Hence, the real aim of speaking is to interact with others or in simpler words to communicate using a language. Since communication seems to be an essential part of speaking, it needs to be defined it in its turn.

According to Baker and Gaut (2002:18), human communication is: "a biologically and culturally based, complex continuing and interactive process in which two or more people use verbal and non-verbal symbols to shape, reinforce or change one another's behaviour, either immediately or over time, for the purpose of satisfying their perspective needs".

The above definition stipulates that communication is:

- **Biological:** in the sense that while speaking, we make use of different organs (articulators) to produce the language. Moreover, a biological maturation is needed to well-utter words since it is the only process (growth) behind the maturation of the different speech organs that ensure an appropriate language production.
- **Cultural:** it is clearly noticed that speech production is deeply affected by the salient cultural characteristics of the society the speaker belongs to.
- **Complex:** since, while communicating, we use different symbols that could be interpreted in different ways.
- **Continuing:** in fact, it existed in the past, exists in the present and will exist in the future. This reflects that language communication will never disappear as far as human beings exist.
- **Interactive:** since the primary aim of any communicative message is to interact and exchange knowledge.
- **Social:** To communicate, we need the participation of at least two individuals. Communication exists because it is shared by members of the same social community.
- **Verbal and non-verbal:** It is generally believed that the only way to communicate is through the use of language (verbal communication). Yet, this is not the only way to communicate, since we can exchange meaning without uttering a word using a kind of body language. This is referred to as non-verbal communication.

The authors, by the end of the definition highlighted the basic objectives of communication that are related essentially to the individual's attitudes: It is either to reinforce the individual's attitudes about the subject matter or completely changing his/her attitudes. This happens immediately,if the communicative message is convincing and persuasive; or it takes time depending on the nature of the message and the characteristics and nature of audience receiving that message.

**1.2-Linguistic Competence vs Communicative Competence**

The term linguistic competence was first introduced by Chomsky in 1965when he made his famous distinction between competence and performance, and which he considers to be the basic principle of a good language production. Zhu Hua (2014:151) argued that Chomsky's linguistic competence means that faculty relevant to human beings about language that is considered to be innate and biological, and which is responsible for language acquisition and mental representation. Crystal (1971:104) too shared the same conception about linguistic competence. He urges that the latter is the sum of a person's knowledge of the rules governing a given language, or simply the system of rules the individual has mastered. Performance, however, according to the same author, refers to the actual use of that system of rules in real life situations, i.e; speech production.

Arnold and Yeomans (2005:56) gave more details about the characteristics of Chomsky's linguistic competence. They reported that this system of rules is basically related to grammar and is innate, meaning born with us and therefore, we have been pre-programmed to acquire language. The second characteristic is that same system is that it is universal and common to all children of the world. This implies that all

children, regardless to their origins or social backgrounds, have the same underlying grammatical rules contributing to a good production of language.

Nevertheless, the basic objective of a language learner in general is to achieve that ability which allows him/her to fluently speak that language, or in simpler words, to easily communicate his/her ideas. Thus the individual is in need of more than grammar so that his/her message would be well understood by others, and this would lead us to shed the light on another kind of competence that is not just grammatical or linguistic, but rather communicative, since, as it has mentioned before, to be effective, the message should be shared and understood by the members of the community in which the communicative message is being uttered. So, what is meant by communicative competence?

The communicative competence is a concept that has been introduced to the field of language studies in 1972 by the widely known socio-linguist Hymes. It was a reaction to the prevailing notion of Chomsky's linguistic competence which Hymes believes to be so limited. The socio-linguist believes that to appropriately speak a language we need more than grammatical rules.

Brown (1987:198) reported that Hymes noticed the insufficiency of the frequent use of grammatical rules to convey a comprehensive meaning. He suggested that a good communicative message needs more social and functional rules rather than concentrating just on grammar. On the basis of that Brown (1987:199) was able to provide his own definition about communicative competence. Thus, he outlined the following: "Communicative competence is that aspect of our competence that enables us to convey and interpret messages and to negotiate meaning interpersonally within specific contexts".

On the other hands, Savington (1983:9) believes communicative competence to be "relative, not absolute, and depends on the cooperation of all the participants involved". In this respect, Savington, in addition to the same ideas that are shared by most researches about communicative competence, and which they all believe to be related to appropriateness to the social and cultural context, the author added the notion of participants. Meaning that a message that is appropriate to the social context in which it is being delivered, it is also meant to be shared by the members of that same context and community.

The most concise definition provided to communicative competence, however, is the one proposed by Hymes himself (1972:277.8), and in which he stipulates:

> To account for the fact that a normal child acquires knowledge of sentences, not only as grammatical, but also appropriate. He or she acquires competence as to when to speak, when not, and as to what to talk about with whom, when, where, in what manner. In short, a child becomes able to accomplish a repertoire of speech acts, to take part in speech events and to evaluate their accomplishments by others. This competence moreover, is integral with attitudes, values and motivations concerning language, its features and uses, and integral with competence for, and attitudes toward the interrelation of language with the other code of communicative competence.

This definition suggests that to appropriately produce language, and therefore to communicate and to be understood, the individual is in need, in addition to the grammatical rules, to contextualize that knowledge of the language, and to people with whom to share that meaning. In other terms, Hymes deeply believed that for a message to be well understood, it needs not just to be grammatically correct, but also socially and

culturally appropriate, i.e, neglecting that aspect of appropriateness of a given message, or what Hymes referred to as socio-cultural significance of words, would inevitably lead to failure in transmitting the intended message.

To make the concept of communicative competence clearer, Wagner (2005:12) provided a detailed explanation of the different components of the communicative competence, basing his overview on the model provided by Canale and Swain in 1980. Thus, he suggested a model of communicative competence that comprises:

a) **Linguistic competence:** it is that knowledge the individual possesses about the language and which includes: grammar, vocabulary, phonology…
b) **Discourse competence:** is that ability to create relationships among words to obtain a meaningful general idea.
c) **Socio-linguistic competence:** it is the individual's ability to produce a language appropriate to the social context, meaning being aware of the importance of the context in which language is being produced.
d) **Strategic competence:** it refers to those verbal and non-verbal actions the individual always resorts to make use of when faced with difficulties of self-expression in speech production, or in other words, a good usage of the different communication strategies.

**1.3-Functions of communicative competence:**

After having exposed the different aspects of speaking communicative competence, it is necessary by now to expose the different functions of spoken language. Richards and Rogers (1986:70), in a survey about the subject matter, agreed

that the functional classification of language us put by Halliday in 1970 is the most appropriate. In fact, according to this categorization, there are seven basic functions:

- **Instrumental function:** in which we can use language to get things.
- **The regulatory function:** it is that frequent use of language aiming at regulating behaviour.
- **The interactional function:** it is the simple use of language to interact and communicate with others.
- **The personal function:** it is the use of language to express private and personal feelings and emotions.
- **The heuristic functions:** it is the use of language to learn to discover and solve problems.
- **Imaginative functions:** it is the use of language to create an imaginary and a creative world.
- **The representational function:** it is the use of language to communicate and exchange knowledge.

### 1.4-Speaking and Communication Strategies:

In general, a foreign language learner's basic objective while acquiring a language is to be able to appropriately express him/herself in that target language. This implies the necessity of mastering the oral aspect of that language among many other details like mastering grammar, intonation, stress…This also entails that being able to fluently express one's self in the target language is a very demanding process for foreign language learners. This is probably the reason why most learners resort to the use of different tactics and techniques commonly referred to as communication strategies.

In its broadest sense a learning strategy, is meant at facilitating learning in general, and its major objective is to impact the learner's way to acquire and organise knowledge. (Weinster and Mayer.1986:315). On the other hand, a communicative strategy, and as the term suggests, is that technique that aims at facilitating speaking in general. As for its major objective, it is still impacting learners' ways to acquire and organize knowledge that is related to all the rules governing just the aural aspect of the target language. Tarone (1981:67) made a distinction between a learning strategy and a communication strategy. According to the author the former is believed to be that technique developed by the learner to enhance the linguistic and socio-linguistic competence in the target language. A communication strategy, however, occurs when the learner fails to achieve the objective of language production, in other words and in the author's own words, a communicative strategy serves just to negotiate meaning.

Corder (1981:103)was probably the one to provide the most concise definition to the notion of communication strategy. He believes it to be "a systematic technique employed by a speaker to express his/her meaning when faced with some difficulty.

This definition stipulates that since it is about communication and how to communicate, a communication strategy is used by speakers just when they face provlems in its production. Besides, there must be an organised and perhaps a step by step tactic which would allow conveying meaning. Corder seemingly agrees with Tarone on the point that a communication strategy is employed by the learner when he/she has difficulties to express himself/herself. Therefore, the aim of a communication strategy is to help foreign language learner to produce speech when failing to establish a comprehensible and meaningful message. In this respect, Goh and Burns (2012:63) outlined two major goals to of communication strategies: First, they are used to by

language learners to avoid massive speech production. The kind of strategies serving that objective, are commonly known as reductive strategies since they reduce the scope of communication. The second aim is to help speakers to transmit the messages using all kinds of resources they possess despite limited linguistic abilities. This second kind of communication strategies serving that objective are referred to as achievement strategies.

Burns and Goh (2012:64-5) believe that there are three types of widely known communication strategies, which include: Cognitive strategies, metacognitive strategies and interaction strategies.

**1.4.1-Cognitive Strategies:** This kind of communication strategies entails the idea the intensive use of psycho-linguistic strategies to compensate the lack of lexical knowledge and linguistic data. These psych-linguistic techniques may include using alternative terms conveying approximately the same meaning; to paraphrase or circumlocuting…

**1.4.2-Meta-cognitive Strategies:** According to the same authors, the meat-cognitive strategies are frequently used by language learners through managing thinking and speech production. In other words, they are mental operations, the objective of which is to adjust thinking with language while producing speech. A good illustration of that could be preparing beforehand what is to be said, paying attention to the message and the language while trying to convey the intended meaning, or simply evaluating the efficacy of the conveyed message after its production.

**1.4.3-Interactive Strategies:** the interactive strategies are also referred to oral communication strategies. This set of strategies handles pragmatic issues of

communication. They entail specific behaviours the learners adopt while facing problems while interacting, and is the only strategy in which focus is equally directed to both speaking and listening. These interactional behaviours may include using gestures and facial expressions, to confirm what is understood through paraphrasing what is heard, checking whether the listener has understood the message or asking the speaker to say something again.

### 1.5-Basic Characteristics of Effective Oral Proficiency

Language production has been a central point of interest for many researchers and psychologists, all trying to identify what is meant by oral proficiency explaining at the same time its basic components and characteristics. Czwenar(2011:230), in an attempt to illustrate language oral proficiency, provided a description of the most important characteristics of spoken language, which she summarised in the following points:

- Speech is delivered via the oral/auditory channel: meaning that, to qualify a produced piece of language to be speech involves at least two individuals having a face to face talk within a particular context. Obviously, this also would impact the choice of both information and language the speakers make use of.
- Spoken language id typically dynamic and interactive: this implies that speech is meant to be used to achieve interactive and communicative purposes that differ from one context to another largely depending on people's needs.
- Most speech is produced spontaneously in the sense that any other human activities and behaviours, speech is the only aspect that is not planned. In other terms, there is just one direct online processing that happens in working memory.

When considering the three previous elements, we can assume that there are criteria that are specific to a good oral proficiency. These involve: accuracy, fluency and complexity. Goh and Burns (2012:42) argued that we can talk about the quality of learners' speech when these three characteristics are respected. So what is the meaning and the contribution of each of them to speech production?

Guillot (1999:2) stipulated that fluency is "speaking rapidly and smoothly, not necessarily grammatically". Goh and Burns (2012:34) agree on that point when they wrote:

> "Fluency is speech where the message is communicated coherently with few poses and hesitations. Thus, causing minimal comprehension difficulties for the listener."

In other words, the three authors share the idea that being fluent involves the fact of a speedy and rapid production of a meaningful message that could be easily understood by the listener without caring about the other aspects of language like grammar.

As for accuracy, Goh and Burns (2012:43) stipulated that, unlike fluency, whose focus is primarily directed to meaning on the detriment of grammar, accuracy is, however, the:

> "Speech where the message is communicated using correct grammar. The notion of accuracy can also be expanded to include correct pronunciation, according to target language form norms"

Thus, and as the term suggests, speech accuracy implies the idea that much of the speakers intention is directed towards the form of spoken language (grammar and pronunciation in particular), rather to meaningful and understood oral messages).

The sum of all what has been said about accuracy and fluency is that both are very important aspects characterizing somebody who can use the language correctly, as put by Baker (2003:9):

> "Accurate speakers do not make mistakes in grammar, vocabulary and pronunciation. Fluent speakers can express themselves appropriately and without hesitation .Fluent speakers do not usually worry unduly about making mistakes."

The third characteristic relevant to a good language speaker is complexity. The same authors provided a very interesting definition to the term. They wrote:

> "Complexity is speech where the message is communicated precisely. More advanced grammatical forms are used such as subordination and clausal embedding, which are appropriate for speech in relation to the social and cultural context. As well as the roles of, and relationships with interlocutors." (Goh and Burns, 2012:43)

This definition stipulates that complexity is that third criterion of a good oral performance that focuses on both meaning (while taking into consideration linguistic, cultural and contextual forms understood by a given community), and grammar (while using different and complex language structures like subordination). Complexity is therefore that criterion that reflects the learner's mastery of the speaking skill through being fluent and accurate.

## 1.6-Types of Speaking Performances

1. **Imitation:** According to Brown (2001:271), imitative performance simply means to parrot back or to repeat different elements of speech (a word, a phrase or a sentence). The author then added that in particular circumstances; the focus is directed towards just one form of language: pronunciation. Thus, the teacher could provide drills that give to the learners the opportunity to listen and repeat some utterances. He also asserts that drills are the best method to enhance oral proficiency development. He wrote:

> "Drills offer to students an opportunity to listen and to orally repeat certain strings of language that pose some linguistic difficulty- either phonological or grammatical…..they offer limited practice through repetition…..They can help to establish certain psychomotor patterns …….and to associate selected grammatical forms with their grammatical context."
>
> (Brown, 2012:272.3)

2. **Intensive:** This second category of speaking performance designed to demonstrate competence in phonological and grammatical aspects of the language. This can appropriately occur when learners are faced with tasks to be done in pair groups through directed response talks, reading aloud, dialogues etc…
3. **Responsive:** As the term suggests, responsive speaking involves the learner to orally reply to the teacher's recommendations, which could be a question or a

comment. Though these replies are short, they carry enough information to convey a meaningful message.

4. **Transactional** (dialogue): Brown (2001:273) believes this fourth type of speaking performance to be an extended form of responsive speaking. It occurs through dialogues and intends, being a part of group work activity, to negotiate meaning.
5. **Interpersonal** (dialogue): Still, according to the same reference, interpersonal dialogue aims at maintaining social relationships than the transmission of information or knowledge. This kind of speaking performance may include:
    - A casual register
    - Colloquial language
    - Emotionally charged language
    - Slang
    - Ellipsis
    - Sarcasm
6. **Extensive** (monologue): It is giving the opportunity for intermediate and advanced levels to produce monologues in the form of oral reports, summaries, speeches etc…

### 1.7-Speaking Basic Classroom Activities

Harmer (2007:34) suggested a number of speaking activities that could be very helpful to prompt oral proficiency.

**1.7.1- Acting from Script**: this first speaking activity suggests the possibility of the learner acting out scenes from plays, course books, or specific passages. In case they

were successful, the author argues that they will be able to act out dialogues they wrote themselves. This activity involves either acting out scenes of play scripts, in which they are supposed to be real actors always drawing attention to appropriate stress, intonation, and speed. The second sub-activity related to the same issue is acting out dialogues. In such circumstances, the teacher should be aware not to choose learners with speaking difficulties, or the shyest ones to ensure the establishment of a motivating atmosphere in the classroom.

**1.7.2- Discussion:** it is one of the most activities in speaking classrooms. It involves the positive exchange of opinions, provoking at the same time spontaneous and fluent language use. Harmer (2007:350)proposes a number of sub activities that aim at initiating discussions, which include:

- Buzz groups, when the learners are required to predict the content of the text.
- Instant comment, when asking students to tell the first thing that comes to their minds after showing them a picture or writing a statement on the board.
- Formal debates, when the student is supposed to argument on favour or against specific attitudes.
- Unplanned discussion, they include those conversations that just happen in the classroom with no previous intention. If well controlled, they could culminate in very satisfactory results.
- Reaching consensus: It covers a sum of activities aiming at encouraging the group to reach decisions, hence, reaching group consensus. In such case, the whole group would spontaneously interact and exchange ideas.

**1.7.3- Communication Games:** These games aim at making students talk quickly expressing their ideas about particular topic. These games include:

- Information gap games: Those which depend on an information gap: it could be solving a puzzle, describing and drawing a picture….
- Television and radio games: if available in the classroom, this kind of games could be a good source of motivation to develop fluency.

**1.7.4- Prepared Talks:** It is that kind of activity which any teacher could assign to his/her students. Thus, once a particular topic is provided to the learner, this latter is supposed to read about it, gather the needed information, and then write down his/her own notes. Harmer (2007, p352) insisted on the fact that students must be given time to prepare and rehearse their notes making the presentation.

**1.7.5- Questionnaires:** They are vital speaking activities since they assure the involvement of both questioners (in most of the time the teacher) and the respondent (the learner). Obviously, each has something to say.

**1.7.6- Simulation and Role Play:** They are very motivating speaking activities because they allow the learner to speak while having fun. It is the opportunity given to students to simulate or to simply act a particular scene as if it happens in real life.

Harmer (2007:352) believes these activities to be very important to the development of oral proficiency because they encourage general oral proficiency development and train students for specific situations especially if they are learning English for specific purposes.

## 1.8-Teaching Speaking

Introducing her book "Speaking" in 1987, Bygate wrote "Speaking is a skill which deserves attention every bit as much as literary skills, in both first and second

languages." Teaching speaking is therefore, a challenging task that requires a skilful and a very clever lesson elaboration throughout which targeted objectives should be achieved. Baker and Westrup (2003:18), provided a very interesting model of how to teach speaking in a language classroom. This model is the so called PPP or the Presentation, Practice and Production Model.

According to the same reference, the PPP is model that is directed to lower levels as well as for students having little input about the target language. Despite this fact, we do not see any objection to implement such a model for foreign language learners advanced level who have just started learning a foreign language and about which they do not have enough knowledge background. In Algeria, as an example, university English language learners do not possess much knowledge about the language in the same way they have about French. Thus, it would be better to consider them as beginners in the subject and facilitate the content to be taught to them. Therefore, the implementation of such a method would be very efficacious.

This model's basic focus is directed towards specific aspects of language that are grammar, vocabulary, and functional language.

The following table summarizes the basic phases and principles of the PPP model as suggested by Baker and Wetrup (2003:21).

| | Teacher activity | Student activity | Skill |
|---|---|---|---|
| Presentation Phase | -Presents new knowledge.<br>-Elicits new knowledge<br>-Presents new knowledge through texts | -Watch and listen<br>-Listen and speak<br>-Read | -Listening<br>-Listening and speaking<br>-Reading |
| Practice Phase | -Models language<br>-Gives written exercises | -Repeat<br>-Read and write | -Speaking<br>-Reading and writing |
| Production Phase | -set up fluency activity<br>-Monitor group work<br>-Watches | -Discuss in groups<br>-Records results of discussions<br>-Present work together | -Speaking<br>-Speaking<br>-Speaking |

**Table 1.1: Example of Language Skills in PPP Lesson**

As it may suggest, The PPP lesson model is divided into three phases: Presentation phase, Practice phase and production phase.

- **Presentation phase:** At this level, the teacher's primary role is supposed to be exposing the knowledge that is said to be transmitted to the learner through oral messages and texts. Knowledge presentation could also be achieved through extracting information from learners to elicit a kind of knowledge exchange. From the learner's side, the basic student's activity at this level is to watch, listen, speak and read. (one can notice that at this specific level, the student learns using his senses).Therefore, the skills that are to be put into practice during this first phase are speaking, listening and reading.

- **Practice phase:** During this second phase, the teacher is supposed to orlly manipulate the language in different ways so that the student could understand and then repeat what is being said, or provide written exercises and scripts to allow the learner to read, understand and take notes. Again, the skills that the learner makes use of at this second level are speaking, reading and writing.
- **Production phase:** As for this third and last phase, the teacher should appropriately organize fluency tasks that might lead to group discussions and debates, monitors speaking activities, observes learners behaviors and reactions, and check the written group works. All these would logically result in the student's recording the upshots of the discussion while presenting the work together. Learners at this level make use of two skills: speaking and writing.

**Remarks:**

I. Although the PPP model major objective is teaching speaking, it also makes use of the three other skills: listening, writing and reading.
II. Before producing speech, learners are in need to brainstorm and handle knowledge previously received from the teacher.
III. The teacher's role in the PPP model is crucial.
IV. Interaction is a primordial speaking activity in this model.
V. Students, while learning, use their five senses and practice the four skills (writing, reading, speaking and listening).

### 1.9-The Role of the Teacher to Prompt Speaking Development

Although oral proficiency development largely depends on the learner's own abilities (cognitive, interactive, social, biological), and his/her own efforts (practice,

repetition…), the teacher could have his/her own role to assure a quick speaking skill development. Harmer (2007:347) reported that the teacher in the classroom has a great contribution to develop oral proficiency. He suggested three basic roles to the teacher that if well respected, would inevitably lead to a good and satisfactory spoken performance, hence the development of the leaners speech. These roles include:

1. Teacher as a prompter
2. Teacher as a participant
3. Teacher as a feedback provider

### 1.9.1- Teacher as a Prompter

As it may imply, the teacher is supposed to motivate the learner, while speaking especially if the latter has speech difficulties or lucks fluency. In such circumstances, a good teacher is the one who knows when to appropriately intervene to help the learner in difficulty. This could effectively happens when the teacher offers discrete suggestions that contribute to the fulfilment of the discussion without frustrating the learner.

### 1.9.2- Teacher as a Participant

This may implies the idea that the teacher could be part of speaking act in the same way the student is. This could be well illustrated in the case where students are having a conversation or a dialogue. The interference of the teacher should not be meant to dominate the speaking act, but rather just to encourage the continuation of the speaking activity, discretely introduce a new information or to maintain a creative and favourable atmosphere for effective speaking to take place.

### 1.9.3-Teacher as a Feedback Provider

Feedback or over-correction is necessary to develop one's speaking competence and ability, however, sometimes; it could be a bit inhibiting to the continuation of speaking task. Harmer (2007:348) suggested that when learners are speaking, over-correction may inhibit them and take the communicativeness out of the activity. This also could engender a psychological blockage for learners, who, being heavily interrupted to be corrected would lose their self-confidence about their own speaking capacities, and hence giving up participation to avoid such an unfavourable situation.

## 1-10- Speech Production

Human being have the tendency to produce meaningful and understood speech effortlessly; however, before production takes place, there is a number of steps and mechanisms involved in the fulfilment of such a process. Goh and Burns (2012:36) outlines that "in fluent conversation, a speaker may generate two or three words per second by retrieving them from a memory store that contains tens of thousands of items". In that respect, it is obvious that the memory store the authors mentioned is working memory, because, as seen in the previous chapter, working memory is that store that is considered limited in terms of capacity and fragile in terms of keeping of acoustic information. Also, it is the one from which human being retrieve information related to speech they are about to produce. It is also assumed that information in working memory is kept therethrough rehearsal, and is easily accessible and retrieved; the thing that explains the quick production of speech.

Thus, to talk about human speech production, it is inevitable to do not mention the different factors involved in the process from the beginning of the formulation of the

message to the real performance (actual speech production). These different factors involve some cognitive processes like memory and some other biological factors like the involvement of the different speech organs in the same process.

### 1.11- A Psycholinguistic Interpretation of Speech Production

To tackle this issue, we have to refer to levelt's model of speech production that basically comprises three different stages:

- Conceptualisation
- Formulation
- Articulation

It is widely known that speech is produced in many sequences of sounds, which contain a meaningful oral message. Yet this actual performance (commonly referred to as articulation) is just one (the last in particular) stage of the whole process of speech production. In fact, there aretwo further stages (conceptualisation and formulation) that constitute, in collaboration with articulation, the main framework of the actual act of speaking. Therefore, these three notions: conceptualization, formulation and articulation are the basic steps leading to an appropriate speech production.

Levelt's model of speech production suggests a three stage process that begins in the brain (conceptualization and formulation) and ends in the mouth of the speaker (articulation). These three steps are said of assure the production of speech only if they are backed by a sub-cognitive process that is monitoring. On the basis of this explanation, the following model that is originally simplified from Levelt's blue print model is suggested.

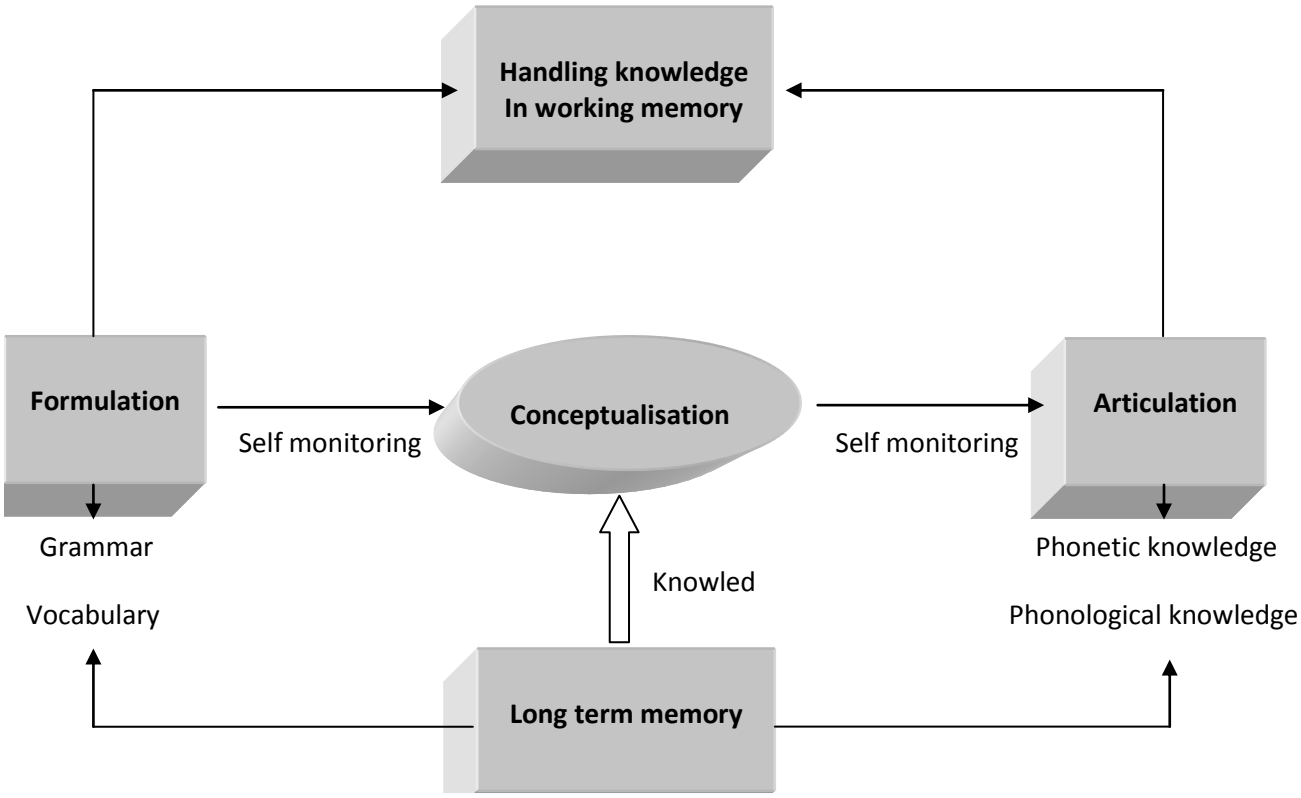


**Figure 1.1: Adapted from Levelt's Model of 1989**

As the model suggests, the whole speech production process occurs during these three consecutive stages, conceptualization, formulation and articulation, each contributes to the fulfilment and realization of the next stage.

**1.11.1-Conceptualisation:** According to Levelt (1989:9), it is the beginning of a silent speech or thought that initially takes place in our brains. It could be considered as a pre-oral message in the sense that it is just about gathering and retrieving knowledge and concepts related to what is about to be produced from long term memory. This also implies that the more the individual possesses enough background information, the

more he/she could be able to easily express himself/herself and therefore, appropriately produce the language. To illustrate this, he wrote:

> "Talking as an intentional activity involves conserving of an intention, selecting the relevant information to be expressed for the realization of this purpose, ordering this information for expression, keeping track of what was said before, and so on. These activities require the speaker's constant attention. The speaker will moreover, attend for his own production, monitoring what he is saying and how……The sum total of these activities will be called conceptualization and the sub-serving processing system will on occasion be called the conceptualizer**"** **Levelt (1989:9)**

To sum up, it can be said that conceptualisation is that first stage in speech production that consists of preparing pre-verbal messages through attentively extracting back two different kinds of knowledge from two different kinds of memory stores. The former type of knowledge is the one available in long term memory, which consists of all types of information making the message. The second type, however, is the acoustic knowledge available in working memory, and which is responsible for providing the needed data about the targeted sounds of the pre-verbal message.

**1.11.2- Formulation:** It is the second stage of the speech production process throughout which the already conceptualized thought is translated into words that are semantically strung together. It is a very defying procedure because that learner, at that level, is supposed to be very selective in terms of vocabulary issues as

well as grammatical facts and rules, as put by levelt (1989:11) to translate the conceptual structure into a linguistic structure.

**1.11.3- Articulation:** It is the last step in the speech production process in Levelt's blue print model. It is primarily related to the actual speaking performance. In other words, it is the spontaneous use of the different speech organs to translate what has already been mentally conceptualized (conceptualization) and linguistically formulated (formulation) into actual speech.

## 1.12- A Biological Interpretation of Speech Production

In the previous section, we shed the light on how language is orally produced as a result of an interaction of some mental mechanisms and some other cognitive processes. Throughout this section however, we will focus on the particular explanation of the biological foundations of speech production. There is evidence that there is a considerable biological relevance to language production, speech in particular, as illustrated by Garman (1999:45). He wrote:

> "The language signal is generated, and perceived, by the operations of some highly specialized biological systems: auditory and visual pathways from sensory organs to the brain, and motor pathways, from the brain to the vocal tract and the hand arm system."

Throughout this quotation, one may notice that the author asserted that the language biological foundations vary in accordance to its different skills. The same quotation also suggests that there are two basic areas that are directly related to language skills: the aural, basically linked to speaking and listening, and graphic, primarily has to deal with writing and reading. As for the biological foundations, the

author again stipulates that there are some biological foundations related to the graphic production and another one related to the aural one.

In fact, both aural skill (speaking and listening) and graphic skills (writing and reading) have the same common organs used while producing the language as indicated in the following illustration:

- Aural skills →→ the brain →→ the vocal tract
- Graphic skills →the brain→→the hand arm system

Thus, it can be easily deduced that the biological foundations of language production the author referred to is basically related to the human organs involvement in the fulfilment of such a process. Since, the focus of the present study is speech/oral proficiency, the following section is devoted to an illustration about the human organs contribution is speech production.

Roach (1991:8), in an attempt to explain human organs, or articulators-as referred to by the same author, contribute to speech production, the author argued:

> "All the sounds we make when we speak are the result of muscle contracting. The muscles in the chest we use for breathing produce the flow of air that is needed for almost all speech sounds; Muscles in the larynx produce many different modifications in the flow of air from the chest to the mouth. After passing through the larynx, the air goes through the vocal tract, which ends at the mouth or the nostrils. Here, the air from the lungs escapes into the atmosphere."

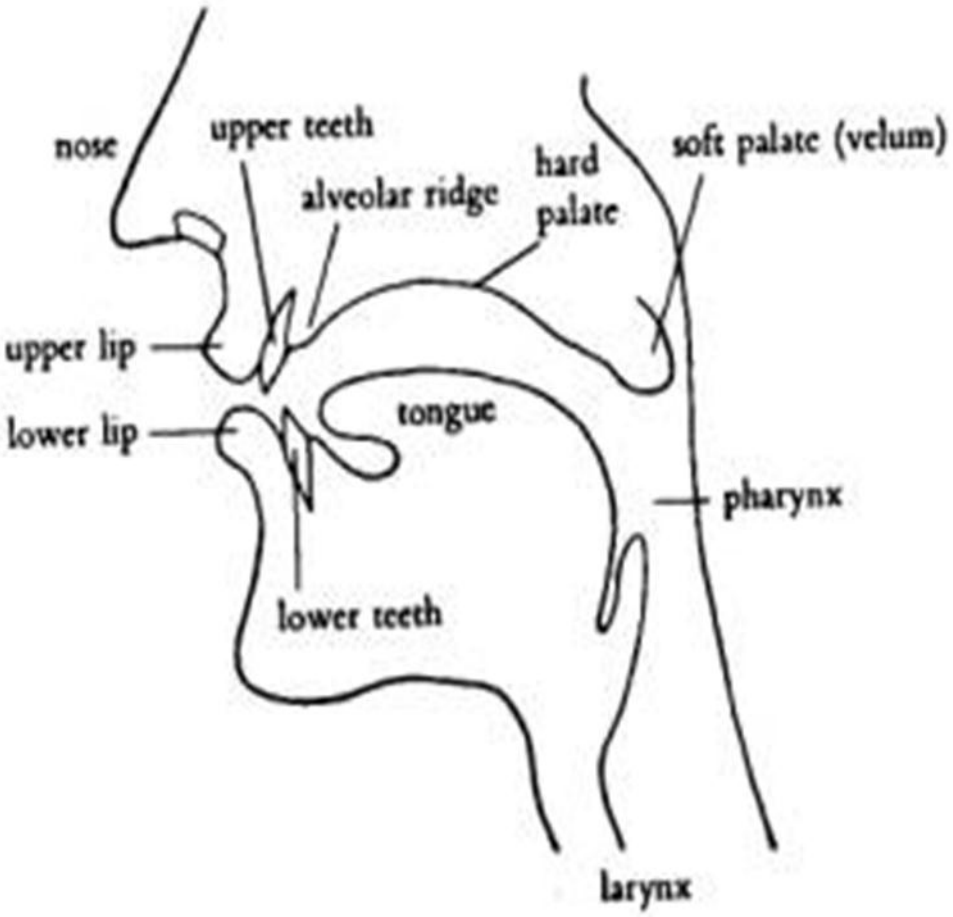


**Figure 1.2: The Articulators (Roach.1991:8)**

In fact, while reconsidering Garman's quotation, we notice that the articulators involved in speech production are: The larynx, the mouth (and what is within the mouth), the lungs and the nostrils (nose or the nasal cavity). In a detailed way, Roach (1991:9) demonstrated the fact as follows:

1. The pharynx: A 7 to 8 cm tube that begins just above the larynx.
2. The velum or the soft palate: It is found inside the mouth and which can be touched by the tongue while producing the /k/ sound.
3. The hard palate: It is the roof of the mouth with a smooth curved surface.

4. The alveolar ridge: situated between the frontal teeth and the hard palate. It could be touched by the tongue while producing the sounds /t/ and /d/.
5. The tongue: one of the most important articulators responsible for the production of almost all sounds. It could be moved into different places. Roach (1991:9) proposed the tongue is divided into different parts- tip, blade, front back and roof- as showed in the following diagram.

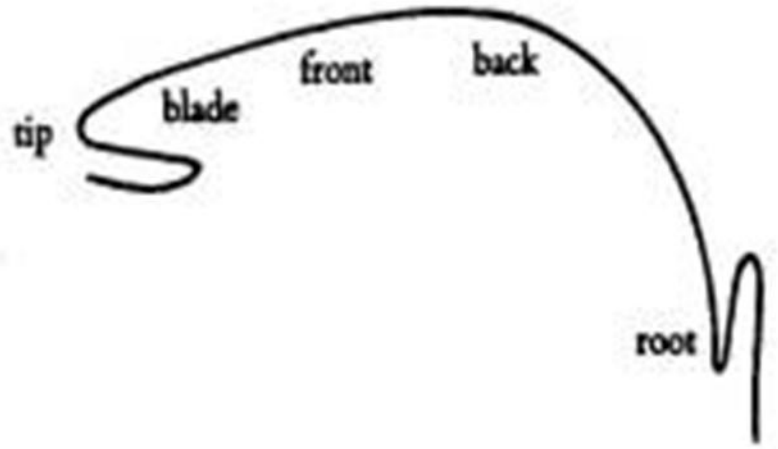


**Figure 1.3 Sub-division of the Tongue (Roach.1991:8)**

**6-** The teeth (upper and lower) commonly responsible for the production of dental sounds like /θ/ and /ð/

**7-** The lips responsible for the production of labial sounds like /b/ and /p/, and labio-dental sounds like /F/and /V/.

**8-** The nasal cavity: or the nose. It is responsible for the production of nasal sounds like /m/ and /n/.

Finally, Roach (1991:10) ended up his illustration by highlighting that the larynx could also be considered as equally important articulators; Liberman and Blustein (1988:4), believe that the larynx is a fundamental articulator in speech production since it is the one responsible for rapidly converting the flow of air coming out from the lungs into a series of puffs of air through closing and opening the airway by moving the vocal cords together.

As for the jaws, Roach (1991:10)stipulated that they are not really articulators. Although they could be moved in different ways, they do not make contact with other articulators to produce sounds.

At the end, the author assumed that the interaction between these different articulators leads to the production of all sounds types making our human speech (consonants and vowels).

**Conclusion**

This chapter, which is related to an overview of the speaking skill, began with providing an overall definition to the topic taking into account all possible variables contributing to its full understanding. It also considered the target objective of speech, communication, through illustrating its different components and how they interact to convey a meaningful communicative message. This was followed by drawing a distinction between the communicative and linguistic competences highlighting at the same time their relevance in speech production. It also raised the issue of the functions of the communicative competence as well as the role it plays in developing communication strategies through exposing definitions and areas of interest related to the subject in question.

Since oral proficiency is the major focus of this chapter, a whole section is devoted to a detailed explanation to what could be the major characteristics of an effective oral proficiency through providing a brief overview to each characteristic of speech production, accuracy and complexity. Types of speaking performances and speaking basic classroom activities are two further notions that have been dealt with in accordance to Harmer's point of view. Then, a model to teaching speaking is suggested, which is judged relevant to the Algerian EFL contexts.

By the end of this chapter, the issue of speech production was approached through explaining Levelt's model, the Blue Print model, to speech production through analysing its three major stages: conceptualization, formulation and articulation. This fact lead us to explain speech production in two different ways:

-A cognitive interpretation taking into account the basic mental processes contribution in speech production.

-A biological interpretation through emphasizing the major physiological aspects of speech production, illustrating at the same time the interaction that occurs between the different types of articulators responsible for the production of all types of sounds making the English language in particular.

# ChapterII:

# Human Memory

## Chapter II: Human Memory

## Introduction

In the previous chapter, some issues related to speaking were tackled to demonstrate their meaning through different interpretations and approaches. We also get acquainted with some basic principles of the concept and even displayed some basic learning styles and strategies that are relevant to EFL classrooms.

Nevertheless, speaking is a complex process in language acquisition and its production largely depend on the interaction of different mental processes especially memorization. In fact a good usage of the different memory systems would result in a good speech production as put by E.G.G Goldstein (2005:137) in his book « Cognitive Psychology »that « you need memory to keep track of the flow of conversation » Therefore, the focus of the second chapter would be directed towards highlighting what memory means, and its relationship to language learning in general and speaking in particular. Concepts like: memory system, sensory memory, short term/working memory and long term memory amongst many others would be dealt with in details, focusing mainly on each part and showing its contribution to the learning process as a whole.

Thus, this second chapter aims at distinguishing between the different levels of the whole memory system, mentioning each time the function of every level (part). Also, we will be able to identify the different processes involved while memorising, and obviously showing the relevance of that overall process (memorization) on knowledge acquisition in general and speaking a foreign language in particular.

It is obvious that learning a foreign language involves the use of different faculties the human mind possesses. Memory is just one example. The latter process has been a question of investigation in both science and philosophy for thousands of years, and has become one of the major concerns of cognitive psychology. Thus to understand the contribution of memory in language learning/acquisition, we have first to identify it.

**2.1- What is Memory?**

Anyone, if asked "what is memory?" would inevitably answer that it is the process of remembering past facts. Someone else would stipulate that it is the fact of storing information somewhere in the human mind to be used when necessary. A more erudite individual would suggest that memory, in addition to remembering and storing information also implies the process of forgetting. In reality, most modern psychologists agree that memorizing includes the three processes combined, remembering, storing and forgetting. Thus, we can deduce that memory refers to the processes that are used to acquire, store, retain and later retrieve information, and forgetting.

It is, indeed, a very hard task to identify what the term really means, since it is considered to be a very abstract concept. A good example of that is when Hunter (1964:13) initiated his book "Memory" by stating that "memory is an abstraction". He stipulates that "some of us could pretend having good memories which can be observed through an exposed behavior after a memory test, yet, none have observed any concrete thing that could be called a memory". In this case, the only thing that could be labelled memory is a whole process of learning something, and then, proving that we are able to remember it. Schwartz and Reisberg (199:237) also, reported that to memorize implies that there must be some learning, or in other words, new information must be acquired.

After the acquisition process, this newly acquired information must be kept somewhere in our memory, a process which is commonly referred to as storage. Finally, this same newly acquired information is normally kept to be used in appropriate contexts. In this case, it is needed to be remember it. This third phase of remembering is widely known as retrieval.

Lieberman (2012:289) in his turn shared the idea that learning and memory are two psychological concepts that are intertwined. He urges that while learning, it is obvious that humans acquire some knowledge. Yet, this knowledge acquisition would be useless if it is not kept for future usage. The author, after deep investigation, suggests that one basic principle to effectively keep information in the individual's minds is practice. In fact, he believes it to be the best and only process that could enhance memory development. He also précised that the effective practice is the one which is spaced not massed. He supported this claim with some interesting findings of Dempster (1996:388) who concluded his work by outlining that the spacing effect ( a term given to the process of memorizing information when it is distributed over organized periods of time) is the most dependable element when it comes to successfully store acquired knowledge.

Therefore, and after consulting many important psychologists' opinions and overviews about memory, it becomes apparent that all of them agree that the concept is intricately related to learning. As a metaphor, it can be said that they are the two facets of the same coin. As a matter of fact, learning cannot occur unless the acquired knowledge is stored in the human mind; otherwise, nothing is learned.

In an attempt to define memory, Moxon (2000:1) gave the simplest definition ever proposed to the concept when he formulates his famous definition "Memory is that

name given to the ability we have to remember things from the past", assuring that the fact of thinking of a precise and synthesized definition would probably be impossible, since we can never fully explain the complexities and ambiguities of remembering.

## 2.2- A Historical Review of Memory Research

The concept of memory has long been a point of speculation and controversy among philosophers and modern psychologists along with the development of the science of cognitive psychology. Each contributed to the explanation and interpretation of the concept according to different perspectives.

During the antiquity, the Greek scholars provided a great deal of reviews, the majority of which aimed at explaining memorization in relationship to another equally important cognitive process that is learning. Matlin (2003:23) largely agrees with that, since she was the one who pointed out that Aristotle was the first one to raise such an issue after a long process of experience and observation as the authentic reasons of human knowledge acquisition, and therefore, according to Matlin (2003:23), he is behind what is commonly known nowadays as information processing. However, and despite the fact that Aristotle contribution to the field was significant, psychology research as a separate discipline to understand the concept of memory actually emerged in 19$^{th}$ century with the findings of Wundt.

Wundt (1832-1920) is worldly acknowledged to be the father of modern psychology when he opened the first psychological laboratory at Leipzig University in 1879. This date is recognized as revolutionary in the history of psychology, because it is the first time that psychology was definitely separated from both philosophy and physiology. Matlin (2003:4) reported that the very innovative contribution of the latter

psychologist to the field was his introspective approach that is based on the premise that highly trained observers should systematically analyse their own sensations, which would be reported in a very rational and objective way. Although Wundt's introspective approach reached popularity at a given time, it was criticized on the ground that this technique is somewhat subjective.

In his turn, Ebbinghaus (1850-1909), one of the followers of Wundt, contributed to the study and understanding of memory processes; yet, he did not adopt the so called introspective approach. Bower (2000:4) reported that Ebbinghaus, while studying memory, focused on a kind of stimulus to learn and therefore to remember some non-sense words. He did that on purpose, so that no semantic association with previous experience and knowledge would be done, thus, being able to understand the human memory in its pure form.

William James (1842-1910) was another psychologist who largely contributed to the understanding of human memory. With the publication of his book "Principles of Psychology" in 1890, he initiated a modern and scientific approach to the study of different concepts in psychology. Matlin (2003:4) argued that James was the one who first made the distinction between two kinds of memory systems: one characterized by being short, and the other one by being long-lasting. The author also stipulated that this distinction would be the main framework to the Atkinson and Shiffrin (1968) model of memory and information processing.

Bartlett (1888-1970) was another figure about whom Moxon (2000:6) wrote that the former psychologist outlined in his book "Remembering" published in 1932, a revolutionary idea about memory stipulating that recall is not just the reactivation of events from a sort of storage bin, but a whole new processing in its own right. In other

words, he believes that we use existing structures of knowledge (what he referred to as schema) to help in reformulating the original memories. Therefore, our attitudes, expectations, beliefs and motivation will highly influence the way we remember.

The concept of memory was even interpreted in psycho-analysis. Freud's interpretation to memory was related to explaining the concept through understanding why we forget. In fact, he was the one who stressed on the importance of emotional factors in forgetting. Donald Hebb (1904-1985), however, when publishing his book: "The Organization of Behaviour" in 1949, stipulated that when we learn, there are some connections that are created and then reinforced between the different nerve cells. Prior to this reinforcement, nerve cells reverberate with the processing of new information. The psychologist considers this reverberation as short term memory. Moxon (2000:8) suggested that according to Hebb, and after 30 seconds of activity, permanent pathways finally form. These latter create different groupings of nerve cells which are referred to as assemblies. It is the creation of these permanent cells groupings that Hebb considered as the biological foundations of long term memory. By the end, we have to stress that, unlike all the other psychologists Hebb approached the study of memory through a purely physiological perspective.

### 2.3- The Information Processing Framework

Randall (2007:14) argues that most psychologists agree that information processing operates by means of a series of memory stores. He highlighted that throughout the model proposed by Atkinson and Shiffrin published in 1968, there are three types of memory systems: the sensory registers, the short term memory and finally long term memory. These latter are believed to be the three basic stages or levels through which information is thoroughly processed.

In fact, Randall's interpretation of information processing does not differ a lot from the one of Baddeley's (1990:10), who, in his turn gave an overview of the human memory system function basing his interpretation on the same Atkinson and Shiffrin model of 1968. Baddeley stipulates that human being receives information (input) from immediate environment. The latter information would be then processed by a number of sensory memory stores, which in their turns are sub-classified into three further categories: visual (sight), auditory (hearing) and haptic (touch), olfactory (smell) and gustative (taste). This same information, after being selectively processed at the level of those sensory registers, is then transmitted to a common short term store for further distinct processing. At last, the short term store or working memory would again relate the selected information to a third long term store. Consequently, one can easily deduce that short term memory basic role, in addition to too many other roles that would be dealt with in the next chapter, is to mediate between the sensory registers and long term memory. In other words, short term memory or working memory is considered as a crucial medium between the two other systems, since incoming information cannot reach the long term store without passing by short term memory, and any needed data available at the level of long term memory cannot be recollected without re-entering STM.

Taylor et al (1982:404) reported that the newly acquired information (input) cannot reach short term memory without passing by a kind of sensory registers which form a pre-categorical memory stage. Then, once in short term memory, the acquired material would be categorized or coded. In this case, the role of each memory system becomes apparent. In fact, the sensory registers role is confined to just perception. The short term memory however has as a major role to recognize and classify the different kinds of knowledge which reach it. Thus, any information that is related to sounds is

coded and stored there (STM), whereas any other kind of information that is semantic or related to some events or even information that is meant to be procedural would be coded too and then sent to long term memory for a permanent storage.

Dehn (2008:14) also shared the same idea about how to process information since he confirmed the idea that there is basically a three system model for information to be appropriately processed, the first of which is the sensory memory which he specifies to be an immediate memory to be associated with a visual information generally referred to as iconic memory, and an auditory information commonly known as echoic memory. The author deeply believes that these kinds of storage (iconic and echoic) last for a very short period of time (not more than some milliseconds).

This input that is now available at the level of the sensory registers would be sent to working memory, a store with a very limited capacity, which in its turn would loose these information if it is not rehearsed (Dehn.2008:14). In case it is decided to be important, the latter rehearsed information would be sent again to a third long term memory, a relatively permanent store where information is kept relatively for a long period of time, somehow permanently.

**2.4- Levels of Processing Knowledge**

As far as information processing is concerned, one can notice that the latter needs to be worked out at different levels. Taylor et al (1982:406) supposed that Craik and Lonkhart (1972) were right when proposing rehearsal as the first level of information processing. Rehearsal, still according to the authors, is said to be a system which is able to maintain the memory trace, yet, it cannot strengthen it. On the other hand, and to tackle the same issue, Dehn (2008:14) preferred to report a distinction

made by Craik and Lonkhart (1972) between two types of encoding that are responsible for information processing: shallow encoding and deep encoding. The former is a kind of encoding that handles surface features, the retention of which is supposed to be very week. The latter, however, is that encoding that basically handles deep structures and meanings. Encoding at this level is purely semantic, thus it leads to a quite satisfactory recall.

Matlin (2003:54) in her turn used the same argument proposed by Craik and Lonkhart in 1972, yet, her focus was on the part where the authors exposed the importance of perception, which is relatively related to analysing the stimuli at different levels. These levels vary from sensory/physical analysis (primarily in the sensory store), to meaning analysis (in long term memory). The authors urged that both types of analyses aim at creating a memory trace. Furthermore, Matlin (2003:55) revealed that, in addition to distinguishing between the different types of encoding (shallow and deep), Craik and Lonkhart also distinguished between two other types of rehearsal, which they labelled: **a)-maintenance rehearsal** that handles and repeats the actual available information in short term, but does not interfere in transferring that knowledge to long term memory and **b)-elaborative rehearsal** which deeply analyses the stimulus, for instance, the individual could create associations between the newly acquired knowledge and the already existing one, or simply developing a mental image.

On the other hand, Woolfolk (2004:239) believes information processing to be the taking of environmental information and modifying its form and content (encoding), and then, keeping that information somewhere in the human mind (storage) to be used whenever needed (retrieval). To make this clearer, the author made an analogy between the human memory system processing and computing data processing, for, she is

convinced that the computer model is the only way that really demonstrates how the human brain functions when handling different kinds of information (data input, processing information and then data output) . One can notice that what is common between the two is, in fact, the processes used when dealing with incoming information. Thus, to fully understand what information processing really means, we have to explain the meaning and the function of the three processes (stages) involved in the processing of knowledge.

**1-Encoding:** according to Weiten (2014:215), encoding means simply to form a memory code for each single information that enters the memory system. Nevid (2013:217), however, believes encoding to be the conversion of acquired knowledge into a form we can store in memory. Baddeley (2002:7) suggests that encoding is that process whereby information is registered. Nevid (2013:217) added that encoding can occur acoustically, visually or semantically; acoustic encoding is to create a code for sounds, visual encoding is to form mental codes for images and pictures and finally, semantic encoding is to transform the acquired knowledge into some kind of codes that express meaning.

**2-Storage:** it is the second phase of the memory information processing, which Nevid (2013:217) believes it to be the process of retaining information in the memory system. For Baddeley (2002:7), storage is the maintenance of information over time. Sweatt (2010:8), however, specifies that storage occurs at different levels of the memory system (as we may see later in this chapter), and thus we have:

•**Sensory information storage:** it occurs at the level of the sensory memory and the results of which provide an echoic memory that refers to auditory memory storage, and iconic memory that refers to the visual sensory memory storage.

•**Short Term Storage:** this second type of storage refers to the maintaining of information in the short term memory system after processing that information and reaching consciousness. On the basis of this, we can conclude that we have two types of sub- short term storage: one concerning new incoming sensory memory input, and the second one is storing in terms of recalling a previously stored memory. In other words, storage at the level of the short term memory system deals with both old and new information.

•**Working memory storage**: it consists of holding information for a very short period of time while this same information is being utilized. It is of three types largely depending on the components of the working memory system:

-Storage of auditory and spoken information in the phonological loop.

- Storage of visual and spatial information in the visuo-spatial sketchpad.

-Storage and manipulation of information that is recently recalled from long term memory by the episodic buffer.

Obviously, all three components are checked and balanced by the central executive, which constitutes the fourth component of the working memory system.

•**Long Term Memory Storage**: In Spielberger's encyclopaedia of applied psychology (2004:57) Vargas and Sukki wrote that long term storage is that kind of process responsible for relatively permanently keeping information after semantically encoding them.

**3. Retrieval:** It is the third stage in the memory information processing. Spielberger (2004:57) edited what Vargas and Sukki reported about the process, and which they consider to be getting back already stored information. It occurs in two different ways:

•Intentionally through recall and recognition of items and events when information is handled at the level of the explicit memory.

•Unintentionally through recollection when information is handled at the level of implicit memory.

On the other hand, Weiten (2014:223) simply argues that retrieval is getting information out of memory. Nevid (2013:217), however, stipulated that the process of retrieval is that mental ability to access already stored information to make use of it in real life situation. Still according to the same author, information retrieval happens in two different ways: effortlessly when information is available and easily accessed to, or simply through using what the psychologist labels retrieval cues. These latter are supposed to be some kind of environmental stimuli that are the result of some mental associations that are created while forming the very first original memories.

**2.5- Atkinson and Shiffrin Multi-store Model**

Tackling the issue of how many kinds of memory are there in the memory system and the processes involved in information processing,would inevitably direct us to the proposals of Sternberg (1999:516) when he suggested the Atkinson and Shiffrin Model of the memory system. This view suggests a multi store approach to memory within which a distinction is made between three major components of the system: the sensory store, the short term store and the long term store as suggested by the following figure:

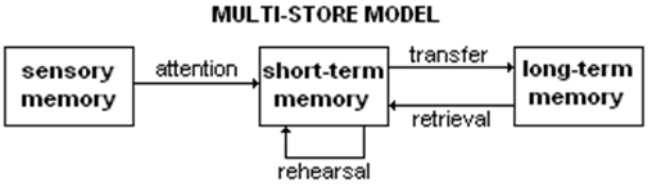


**Figure 2.1: The Multi-store Model of Atkinson and Shiffrin (1968)**

The author reported that to process information, there must be an active interaction between the three memory systems that goes on both senses: from the sensory memory to the long term memory and/or from the long term memory to sensory registers, and in both cases, the incoming information must pass by the intermediate system which is the short term/working memory.

Besides, Sternberg (2009:186) briefly explained that the two psychologists, while depicting the multi-store model, made the distinction between the functions of the short term store and the long term memory system, something that was revealing at that time. They certified that the short term memory function is confined to just using verbal codes that would be lost if it is not supported by some control processes like rehearsal. The long term store, however, frequently uses semantic codes to permanently keep information there.

Nevertheless, the best details about the multi-store model are thoroughly due to the findings and researches of the British psychologist Baddeley. In his book, "Essentials of Human Memory" (1999:10), Baddeley asserted that, although there is a great deal of controversy and speculation about the different types and levels of the memory system, most psychologists and specialists in the field agree that there are basically three types/levels of memory varying from a perceptive system at the level of the sensory registers, a short term store and another long term one.

The author added that the three levels are well represented in the already proposed model of Atkinson and Shiffrin of 1968, a model which came to be known as the modal model. This model stipulates that information generally comes from one major source, which is environment, and it enters the memory system due to a number of sensory memory stores or registers. The perceived information would be then directed toward a common short memory system, at the level of which the psychologist estimated that it acts like a working memory especially when handling acoustic information. He believes it to be a working store for information is always available, active and ready to be used without any mental efforts. The working memory, in its turn would relate semantic information to a third long term store to be permanently retained there. In case it is needed, it would be retrieved back from the memory system via the controlling process of retrieval.

All in all, and in the light of what has been said so far concerning the memory information processing, we come to the conclusion that to successfully process information in the memory system, we largely depend on three basic memory processes, which are encoding, storage and retrieval.

After having considered both models and levels of memory processing, it can be deduced that there are three major types of memory systems: sensory memory, short term/working memory and finally, long term memory. The following sections are therefore reserved to detailed overviews about the sensory registers and long term memory. Working memory however will be dealt with meticulously in a separate chapter.

### 2.5.1- Sensory Memory

Woolfolk (2004:240) believes the sensory memory to be a perceptive system whose capacity is very limited; Furthermore, any perceived information does not receive any attention. The sensory store is, according to that handbook, of two types, iconic and echoic. The former is related to a kind of information that is perceived visually, whereas the latter is the other kind of information that is audibly perceived.

Dehn (2008:16) reported that sensory memory is the first system to process incoming information. He also stipulated the system to be composed of three sub-sensory registers:

•Visual/iconic memory, dealing with seen knowledge.

•Auditory/echoic memory dealing with what is heard

•Haptic responsible for processing what is touched

According to Lieberman (2012:316), it is at the sensory memory that we form any memory related to whatever kind of experience, and which could be visual or auditory. Matlin (2003), while tackling the issue related to that part of the memory system, provided a detailed interpretation to the whole process of perception, since she admitted that our senses used by the memory system to receive environmental input to be kinds of perceptive processes. Thus, and still according to the author, perception is an effortless process that uses previous knowledge to be able to gather, and then interpret the stimuli registered by the senses.

Matlin (2003:316) suggested that to successfully perceive knowledge, one must make use of two further sub- mental processes, which constitute in themselves the two

most important aspects of perception. They include object recognition and attention. The former is believed to be a sensory process the role of which is to identify a complex arrangement of sensory stimuli. The author assures that environmental information cannot enter the memory system unless the objects are recognized by the senses, which would next transform and recognize this raw information. Then, she proposed two ways of how to recognize objects. These are the top-down processing and the bottom up processing.

Lieberman (2012:318) considers the bottom-up processing to begin processing incoming knowledge at the senses, and then continue in a more complex way until achieving the higher levels of the cortex. Matlin (2003:41) interpreted this as in the case when information starts from the most basic (bottom) level until reaching more sophisticated cognitive processes (cortex).

The top-down process processing, however, is reported by Lieberman (2012:318) to be a mental state in which the available data are processed at higher levels. Matlin (2003:41) explains it in the same way since she believes it to be the complete opposite of the bottom-up processing starts at higher levels in the brain (cortex) to end up in the senses.

The other aspect of perception to which the following section is devoted is attention. In his book, Introduction to Psychology, Plotnik and Kouyoundjian (2013:241) urge that if there is no attention paid to incoming information at the level of the sensory registers, it will be forgotten. Thus, incoming information cannot even enter the memory system, the working memory in particular, if we do not pay attention to it. Matlin (2003:51) proposed a brief, yet, a concise definition to the term when she wrote "it is a concentration of mental activity". The author here draws our attention to the fact

that there is a kind of mental focus or emphasis when it is question of dealing with the tremendous quantity of environmental stimuli the human organism receives. Plotnik and Kouyoundjian (2013:241) argued that this is because of the attentional selection that occurs at the level of the sensory registers due to which we could be kept from being overwhelmed by the environmental stimuli, if we keep believing that, while still perceiving, any sensory processing (perception) that is not paid attention to would vanish within seconds.

On the basis of what has been tackled before, Matlin (2003:53) was able to make the distinction between two types of attention:

•Selective attention which is said to be that concentration on specific items (generally the most important ones) at the expense of others that are most of the time ignored and therefore forgotten.

•Divided attention: it is that kind of attention in which people are supposed to give equal importance to the different items composing the target object.

**2.5.1.1- Duration and Capacity of Sensory Memory:**

It is obvious that incoming information cannot last for a long period of time in the sensory stores. This is well illustrated through the fact that, despite the huge amount of data our senses are exposed to, most of them quickly decay if it is not paid attention to. Hudmon (2006:42) asserted that many investigations about the question have been carried out to know about the duration of information in the sensory registers. Most of the results showed that memories at that level are extremely short lived. In fact, he demonstrated that time allocated for memories to remain there varies from one fifth of a second to few seconds. The author also reported that thanks to the fact of having a brief

sensory memory helps a lot in filtering and selecting the tremendous amount of information our senses are subject to.

As for its capacity, Weiten (2014:220) believes that the sensory memory holds information in its original sensory form, but within a fraction of a second, and that the only way to make of these perceived sensations a memory, one has to attentively select the sensory input. In other words, the capacity of the sensory memory is large enough to hold all the perceived sensation, but within a very short period of time.

#### 2.5.1.2- Ways of Perception

Since we admitted that the only way for environmental input to enter the memory system is via our sense, this implies that we have many ways (types) of sensory registers. Most psychologists agree that humans have basically three ways to perceive different sensations: visual (iconic), auditory (echoic), haptic (touch), olfactory (smell), and gustative (taste) and

- **Visual Sensory Memory**: It is also referred to as the iconic store. According to Nevid (2013:218), the visual sensory memory is a store where visual stimulus is encoded in the form of a mental image. The author even called it a kind of photographic memory, the objective of which is to hold different visual images or scenes in the mind for no more than a fraction of a second.
- **Auditory Sensory Memory**: It is also a second type of sensory registers that is referred to as the echoic memory. Nevid (2013:219) believes it to be that repertoire where auditory stimulus is encoded in the form of a mental representation of sounds. The author also assures that the echoic memory

duration is a bit longer compared to the iconic one. The information could be held there for two or three seconds longer than the visual mental images.

- **Haptic Sensory Memory**: According to Puri et al (2014:36) Haptic sensory memory is that repertoire where incoming information could enter the memory system via touch.

In addition to these three kinds of sensory stores, Thompson et al (2005:28) suggested a fourth type of sensory memory that is responsible for encoding the entering information via smell, which he names olfactory sensory store.

### 2.5.2- Short Term/Working Memory:

It is that store where information is kept for a short period of time, and it performs various functions basically related to understanding and calculating (Baddeley.1999:15).Thus, short term memory is that name given to a sort of store system that is essentially responsible for temporarily holding information. (Details will be dealt with in the next chapter).

## 2.6-Long Term Memory

Researches about long term memory emerged as the result of some concerns related to basic questions that tackle the issue of how to store semantic information or information that has a meaning and therefore has been understood by the individual (Wolfgang.1994:XII). In fact, this distinction between the two stores of the memory system as first initiated by James in 1890 because he was the first one to discern between what he considered primary memory, which relates to perceived information that remains in the consciousness and thus becomes part of the psychological present. The second part, however, is what the psychologist dubbed secondary memory, which

contains information that left the consciousness and becomes part of the psychological past (Eysenck and Keane.2000:153).

Eysenck; in Baum et al (1997:25) reported that people used to believe that the only way to think about the question, and therefore, to understand memory is to assume that there is one single unitary system that deals and handles information in the same way. Yet, and with science development, psychologists could finally reject this assumption. It has become apparent that different kinds of information cannot be handled in the same way and by the same unitary system.

Hence, in terms of function, there are at least two different stores. One is of a very limited capacity, and information could be held there for a fraction of a second. Its major focus is to handle acoustic information. The other one is supposedly thought to handle information the content of which is understood (meaning) or the information in question relates to some events or episodes in our lives, or simply devoted to remember the procedures of how to use specific skills and do particular activities.

Another biological distinction has been made between two stores which the author believes to occupy different places in the brain (the strongest evidence that the two stores are completely separate). Eysenck in Baum et al (1997:27) reported that amnesic people (the long term memory of whom is damaged) basically have intact short term memory; whereas some few brain damaged patients revealed to have problems at the level of short term memory coupled with almost a normal long term memory.

Another equally important distinction that has been made between the different components of the memory system is the one suggested by Chance (2009:337). The author outlined that the best way to effectively distinguish between memories is

primarily due to what he calls retention interval. The latter is supposed to be the period of time that is between a given learning experience and its recall. This distinction, therefore leads to make a clear cut between a memory system the retention interval of which is very quick (Short term/working memory), and a second memory system the retention interval of which is long lasting (long term memory).

At last, Eysenck, in Baum et al (1997:26) could finally assume that taking into account the function of each store, long term memory proved to be more important since it is the one which assures long term learning. Thus, and because of its great relevance to the learning process improvement, we have to identify that concept.

### 2.6.1- What is Long Term Memory?

According to Gathercole and Alloway (2008:13), long term memory is the reservoir that is full of past experiences, or of knowledge that has been acquired a long time ago.

For Weiten (2014:222), long term memory is thought of to be an unlimited capacity store that can hold information over lengthy periods of time. Woolfolk (2004:246), however, considers long term memory as a store that holds information that is well learned. The author, in this case, explains that to store information in long term memory, there must be a kind of understanding to the acquired knowledge and some semantic associations are to be made to assure an everlasting storage.

On the other hand, Sternberg (2009:188) believes the same concept to be that mental faculty which allows the storage of information with us over long periods, perhaps indefinitely. Levine (2002:93), while tackling the same issue, proposed that long term memory is a warehouse for more or less permanent knowledge. As for

Cardwell and Flanagan (2005:1), they believe it to be that system which refers to events anywhere from ten minutes to 100years ago, and which has a potentially unlimited duration and capacity that tends to be semantically encoded.

All in all, the sum of all psychologists' definitions of the concept of long term memory provides common assumptions related especially to two factors: capacity and duration of information of the store. Therefore, and in the light of what has been said so far, it can be concluded that long term memory is that reservoir that is there in the human mind, the capacity of which is unlimited, and information could be kept there for life, meaning that the best learning is precisely and basically owed to long term memory.

### 2.6.2- Learning and Long Term Memory

Shumway-Cook and Voollacott (2007:85), in an attempt to identify the link between learning and memory, defined learning to be the acquisition of knowledge or ability, whereas memory they think it to be the logical outcome of learning that involve the storage and maintenance of that knowledge and ability. The authors also suggested that if learning is a process, memory is the product of that process.

On the other hand, Chiras (2012:206) demonstrated that learning is still a process throughout which humans acquire and retain knowledge and skills, but which largely depends on memory. The author then identified which of the memory system helps in knowledge learning. According to him, information in short term memory quickly decays, whereas that stored in long term memory is retained for much longer periods. Since the practical aim of any learned materials to be permanently kept to be

used whenever needed, it is obvious that long term memory is the one which successfully performs that role.

Shumway-cook and Voollacott (2007:86) suggested habituation as the motor of long lasting retention of information. In fact, they declared that when we learn, we are obviously exposed to a great amount of stimuli that are most of the time repeated. Hence, the more one gets habituated with these stimuli, the more information would be consolidated in our brains, and therefore facilitating the whole learning procedure.

Biologically speaking, the same authors explained habituation to be related to a decrease in synaptic activity between sensory memory and motor neurons and their connections to inter-neurons and motor neurons; the thing that is considered in psychology to be the basis of any memorization procedure.

Trying to illustrate the role long term memory in learning, Rothwell (2008:29) précised that it emerges as the eighth stage of what he refers to as the workplace learning process. In fact the author explicated that converting information into a useful knowledge, and then storing it in the memory system constitutes an effective process of learning or an adequate knowledge acquisition. However, in case there is nothing remembered, this implies that no learning took place. Remembering, still according to the same author; occurs at two different levels. Short term memory within which all learned and heard information would decay in a very short period of time. Yet, in long term memory, everything would be retained there forever, and is ready to be remembered ones needed.

In their turn, Furjanic and trotman (2000:72) in order to highlight the link between long term memory and learning, identified three types of processes that are

responsible to relatively and permanently store information in long term memory. These include: learning effort, message decoding and distractions.

- Learning effort: It refers to that energy we generally make use of to transfer the perceived information into long term memory. This could happen via four basic ways:

-creating images and pictures in the learners' minds.

-mentally arranging and organizing the received information, so it could be reachable when needed.

-Relating what learners have just received with information that already exists in long term store.

-Repeating the received information many times, since it is the only way to relate it to long term memory.

- Message decoding: The message decoding means the effort learners spend to understand the massage. In this respect, Furjinac and trotman (2000:75)added something very interesting about the subject. They stipulated that the more time and energy a teacher spends to explain the information that is intended to be transmitted, the less effort they would expend on learning the different concepts and skills. Meaning that the decoding process is facilitated by an extra factor who is the individual teacher.
- Distractions: By the term, the authors meant any factors that could deviate the learners' attention. For, if the learners are not concentrated, or do not pay

attention to the very little detail while leaning, the transfer of knowledge to the long term store would be quite impossible.

### 2.6.3- Capacity and Duration of Long Term Memory

Another equally important issue that is to be handled when tackling the question related to long term memory is the one about the capacity of the store and the duration of information there. O'Donnell et al (2012:234) initiated the section related to the topic specifying that both capacity and duration of long term memory are unknown. Then, they précised that its capacity is very large, and the duration of information there is very long. As for the content that is retained in that same store, it can include all kinds of information.

Cardwell and Flanagan (2005:4) however, reported that the capacity of long term memory seems to be unlimited, whereas what is stored could permanently remain there. Also, they suggest that retrieval, needs time and efforts to effectively access information that is secured there.

Concerning Casippo and Freberg (2013:342), they shared the same conception about the duration and capacity of long term memory that they completely assure to be long and large. Yet, they emphasized on something that is basic to that same memory system. It is the one of coding. they assure that to hold information, long term memory resorts to provide acoustic, visual and acoustic codes to recognise knowledge. The authors, then précised that coding at the level of long term memory is basically semantic that is very essential to learning.

### 2.6.4-Types of Long Term Memory

On the basis of what has been exposed as far as capacity and duration are concerned, one can guess that we permanently hold different kinds of information in long term memory. This implies that long term memory is of different kinds largely depending on the nature of information that is to be stored.

Nevid (2013:224), in an attempt to identify the different presumed types of long term memory, began the survey by the following question: What types of memories are stored in long term memory? Outlining that a long term memory type is developed on the basis of particular criteria like the kind of information that is stored in the system. Thus, he proposed a first division of long term memories which he called declarative memory (knowing what or meaning) and procedural memory (knowing how or manner).

**A-Declarative Memory:**

According to the same author, declarative memory (which is also referred to as explicit memory) is that memory system that is responsible for consciously storing factual and personal information. According to Goldstein (2007:186), declarative memory is our very conscious remembering of already experienced events or just some facts that are learned. However, in the Concise Corsini Encyclopaedia of Psychology and Behavioural Science (2004:264), the declarative memory is that representation of facts and events which are the result of conscious recollection. Besides, most psychologists agree on the fact that declarative memory is subdivided into two further categories: semantic long term memory and episodic long term memory.

Tulving (1972) could give a clear categorization of declarative memory stipulating that it is made of one system, which is completely semantic and another one which is episodic. For him, to distinguish between both episodic and semantic memories, both of which he believes to be two distinct information processing systems, he started by providing the similarities that exist between the two of them, and which could be summarized in the following points:

a)Both selectively receive information from the perceptual system or other cognitive systems.

b)Both retain the maximum of aspects of information.

c)Upon instruction, both send the retained information to other systems, especially those responsible for translating it into behaviour.

After stating the similarities between both memory systems, Tulving(1972) was then able to stipulate the main [2]&points of differences that are as follows:

a)They both store different kinds of information.

b)One is auto-biographical; whereas the other relies on some cognitive references when storing information.

c)Conditions and consequences of retrieval are different in both systems.

d)They also differ in terms of their dependence on each other.

This very clear and detailed distinction between the two memory systems, lead the author to provide a definition for each system. Therefore, he outlined that semantic memory is:

> "...The memory necessary for the use of language [can be said to be] a mental thesaurus, organized knowledge a person processes about words and other verbal symbols their meaning and their referents, about relations about them, and about rules, formulas and algorithms for the manipulation of these symbols, concepts and relations.....and retrieval of information from the system leaves its content unchanged."(Tulving.1972:386)

Tulving's definition of the semantic memory system largely depends on two distinct sides: the first one related to the way the system chooses the information to be stored and the second one is about the way we get back the information from that system. Tulving believes that semantic memory is that system that is responsible for storing all kinds of information that are understood or that carry a meaning. Concerning retrieval, at this same level, it is said to be unchanged; meaning, if the encoding process occurs successfully, while retrieving, the system would extract information content that is identical to the one that has been stored at the beginning.

All in all, we can assume semantic memory to be that kind of long term memory that is responsible for keeping information that is the result of meaningful knowledge acquisition (learning); i.e., all information, the meaning of which is understood by the learner. To illustrate that, Gathercole and Alloway (2008:15) suggested that information that could be stored in semantic long term memory is our mental lexicon of language which stores information about words like their meaning, spelling or even pronunciation. Besides, the authors assured that semantic memory is able to store information about the visual characteristics of concrete objects and other familiar entities such as faces of people.

As for episodic memory, Tulving (1972:385-6) stipulated that:

> "It receives and stores information about temporally dated episodes or events, and temporal spatial relation among these events.....it is always stored in terms of its autobiographical reference to the already existing contents of the episodic memory store. The act of retrieval of the information from the episodic store..... and thus changes the content of the episodic memory."

Thus, to identify the episodic memory, the author again relied on the kind of information that is stored, and then on the act of retrieval. He deduced that, unlike the semantic memory, episodic memory stores information that is related to specific events of our lives and the spatial context in which these events took place. The retrieval process, however, is said to change the content of the stored information, which is not the case of semantic memory. Gathercole and Alloway (2008:14) also shared the same idea with Tulving concerning episodic memory since they argued the latter system is responsible for keeping information about our lives and events that occurred in the relatively recent past.

**b-Non-declarative Memory**

It is a second category of the memory that is also referred to as implicit memory. Sanderson (2006:215), he believes non-declarative memory to be that unconscious recollection of information that is related to the performance of particular actions. Hence, it is generally filled with that knowledge that is related to skills, habits and sensory motor responses; that is why it is frequently referred to, in addition to non-declarative and implicit memory, as procedural memory.

## 2.7- Memory Strategies: Mnemonics

As already explained, successful memorization largely depends on a good encoding. We also mentioned that the latter process (encoding), is believed to be the individual's ability to create a code at the level of the memory system due to which the retrieval process would be facilitated. Yet, it happens that, for whatever reason, we find ourselves unable to remember things which are thought to be completely stored in the system. This is probably due to the failure in the encoding process owed to some reasons lying beyond our human ability. It is for that reason that psychologists developed a kind of artificial techniques helping in consolidating the encoding act of our memories. These are mnemonics.

### 2.7.1- What is Meant by Mnemonics?

Worthen and Hunt (2011:2) believe that a mnemonic is a cognitive strategy designed to enhance the encoding process of an information and therefore its storage and then its retrieval.

According to Nevid (2012:221), a mnemonic is a device for improving memory. For Rief and Stern (2010:253) mnemonics are memory devices that help people remember something by associating what they are trying to remember with something they already know.

Matlin (2004:162) said that mnemonics is that use of a given strategy to help memory perform its different processes. Dehn (2008:280), however, suggested mnemonics to be a subtype of memory strategies that help enhancing the meaningfulness of the material to be remembered, and thus facilitating learning.

All in all, we can assume that mnemonics are some memory techniques or strategies that are used to facilitate the encoding and then the retrieval processes of information. Its main objective is therefore to facilitate the process of keeping the acquired information in our minds and then, recalling it when needed. This can occur via the use of images or making connections or simply organising information. Mnemonics are also very important while learning since they consolidate the storage of the learned material.

There are many mnemonic strategies which include:

#### 2.7.1.1-First Letter Cuing

According to Turkington (2003:21) the first letter cuing is a mnemonic technique which is based on the premise that the first letter of a word is used as a cue to remember the word itself. It is of two types: acronyms and acrostics.

#### 2.7.1.2-Acronyms

It is a kind of first letter cuing which Nevid (2012:221) explains in term of the easiest and widely known mnemonic device. He stipulates that it is a word composed of the first letter of a series of words. A good example of that is the use of the use of the word HOMES to remember the names of the five great likes; Huron, Ontario, Michigan, Erie, and Lake Superior.

#### 2.7.1.3-Acrostics

Still according to Nevid (2012:221), an acrostic is also closely related to the first letter cuing. It is a verse or saying in which the letter of each word, typically the first letter, stands for something else. A good illustration of that is the widely used acrostic “Please

Excuse My Dear Aunt Sally" helps students to remember the proper order of mathematical operations: Parenthesis, Exponents Multiply and Divide before adding and subtracting.

In his turn, Dehn (2008:282), also provided other categorization of mnemonics that are:

### 2.7.1.4-Imagery

It is a kind of mnemonics that involves the transformation of verbal content into visual information. It is basically beneficial for learners having language problems.

### 2.7.1.5-The Key Word Method

It is a mnemonic that is strictly related to learning vocabulary. Dehn (2008:283) argues that the use of that mnemonic is based on the premise of creating an association between the new word and an image involving a related word, generally in the mother tongue, and which serves as a key to remember the new word. A good example of that is when a student of French could remember that the French word "pain" means bread in English by picturing a loaf of bread in a pan.

### 2.7.1.6-Chaining

Dehn (2008:285) believes that mnemonic to be very useful when it is question to remember item in a serial order. In this case, the student is supposed to create a link between an image and the first and the second word, and then a second image for the third and fourth word and so on.

### 2.7.1.7-Loci

It is also a visual mnemonic technique. The word “loci” is a Latin Roman word which means room. The “loci” mnemonic is systematically based on the fact of remembering an image within a room that is then related with the kind of information to be remembered. Thus, while retrieving, the individual would recall the room associated with a particular image which would stimulate the retrieval of the target information.

As an example, to remember the order of the 48 Algerian wilayas, one can use the loci technique. The individual has to visualise the image of the desert of the wilaya of Adrar in the first room, and then another image to the second wilaya in the second room, and so on. This mnemonic technique used to be exploited by the Roman orators to be able to remember their speeches using sufficient rooms in public buildings.

Matlin (2004:166) in her turn suggested two further techniques of how to consolidate keeping information in our minds or as she put it “how to organize information in our memory system. She talked about chunking and hierarchy technique.

### 2.7.1.8-Chunking

The author (cited above) believes that chunking means an organizational strategy in which we combine several small units into larger units. In fact, she believes that people have the tendency to successfully remember materials that are grouped into meaningful and familiar chunks better than when the same material is grouped into an arbitrary way or ungrouped at all.

### 2.7.1.9-Hierarchy techniques

Still according to the same author, the hierarchy technique is another effective way to organize acquired knowledge or information through constructing a hierarchy. This latter consists of items that are arranged in a certain order of importance: from the more general to the more specific or from the more important to the less important and so on.

## 2.8- Memory and Forgetting

In the previous sections, the whole memory system was identified with its three components or levels as put by Atkinson and Shiffrin (1968;1971). How information is processed by that system, where does that information come from, and how is it successfully retrieved from our memorywere also questions that have been meticulously explained. Yet, it is noticed that retrieval is not always successful, and sometimes people find themselves unable to retrieve anything. This fact is referred to in psychology as forgetting or memory decay. The question that is to be raised is therefore why do we forget?

Lieberman (2012:395) suggested that there are two major causes of forgetting. The first one is time passing. In fact, and it is by nature, the more time passes, the harder it becomes to recallinformation. The second cause of forgetting, still according to the same author is how to spend that time which passes. Lieberman (2012:396) believes that as time passes, we form new memories which would in a way or another, erase the oldest ones that is why it is an easy task to remember the recent events and very hard to recall the old ones.

In an attempt to explain information forgetting from the memory system, woolfolk (2004:255) suggests that the memory decay or simply forgetting happens at two levels of the memory system.

**-At the level of working memory:** In this case, the author explained that information lost from working memory before being appropriately encoded to be sent to long term memory completely disappears, and it can never be recalled.

**-At the level of long term memory:** The author believes that in case information reaches long term memory, it will permanently remain there. In other words, it cannot be lost from the memory the system. Failure of retrieval at that level is rudimentary due to either time decay (time passing), or interference (the process that occurs when remembering certain information is hampered by the presence of new and recent information).

On the other hand, Nevid (2013:232) approached the same issue of forgetting by trying to illustrate the decay theory. First of all, the author reported that we all have memories that decay and deteriorate over time. He supported that claim with the left writings of the Greek philosopher Plato some 25 centuries ago. This Greek theory of forgetting is known today as the Decay Theory. The author then suggested the works and findings of Ebbinghaus as probably one of the first modern explanations of forgetting. He urged that to understand what is meant by forgetting, Ebbinghaus knew that memories should be investigated in their pure form far away from any kind of association. That is probably why he created a list of meaningless words which he presented to himself and determined the number of trials it took for him to perfectly remember the non-sense syllables. Then, he tested himself again at different intervals to see how much he could forget over time. The results showed that there is a deterioration

and decline in terms of information, the thing that has come to be known as the Ebbinghaus Forgetting Curve.

**Conclusion**

In drawing conclusions about the human memory system, one may take into consideration the fact that the latter system is made of three basic parts:

1. A receptive part responsible for allowing incoming information to enter the memory system through the senses: visual, auditory and haptic (we have, of course, the olfactory (smell) and gustative (taste) senses, which have been less studied by researchers in the domain of memory). Their objective is to select the information that is to be sent to the inner levels of the memory system.
2. A short term memory or working memory: a mediating system that allows the selected entering information to pass to the third level after distinguishing between the different types of input: a semantic input would be sent to a third level (LTM), and an acoustic information or simply sounds are kept in short term memory that then turns to be a working memory responsible for handling sounds we generally use to produce the language.
3. A long term memory: is a large reservoir where semantic and other types of processed information (important events and some skills) are permanently stored there to be extracted back whenever needed.

Obviously the processing of information cannot occur unless it is accompanied with some further sub processes that would allow an appropriate memorization. These processes are:

1. Encoding: it is to convert the perceived knowledge into codes that are necessary while getting back information.
2. Storage: it is the act of keeping information in the memory system.
3. Retrieval: it is the act of extracting back or recalling the already stored information.

In addition to that, the phenomenon of memory failure (forgetting)has been explained, showing at the same time the causes behind that failure (time passing and interference).

Finally, to ensure a good storage of information in the memory system (more precisely at the level of long term memory), a number of mnemonic strategies have been exposed, the use of which would consolidate the long term storage of knowledge.

# Chapter III:

# Short Term Memory

# Working Memory

## Chapter III: Short Term/Working memory

## Introduction

In the previous chapter, we highlighted some important notions related to memory in general and its relationship to foreign language learning in particular. Thus, concepts like sensory memory, short term memory and long term memory have been tackled in an attempt to understand the function of each. Besides, the issue related to the different processes used by the memory system as a whole to receive, keep and later to retrieve knowledge whenever needed is raised in a try to be able to distinguish between the tasks of each type of the whole memory system. Hence, it could be assumed that sensory memory basic objective is allowing selected environmental knowledge to get in the memory system; whereas long term memory is responsible for permanently keeping different types of input knowledge in its different compartments: semantic, episodic and procedural. As for working memory, which has been approached briefly since details would be tackled in the present chapter, it is hypothesized that it is the part of the memory system that is essentially responsible for storing and processing acoustic knowledge commonly used in speech production. Obviously, this is due to the nature of its different components.

Therefore, the aim of the present chapter is to emphasize on working memory through finding out what it really is and how it processes knowledge. Also, some light will be shed on its relevance on learning a foreign language, particularly its contribution in developing learners' oral proficiencies. Notions like the phonological loop, the visuo-spatial sketchpad and the central executive would be dealt with in details. In addition, we will try to explain how working memory capacity could be a significant variable in improving or hampering speaking skill development.

By the end of this chapter, it would be hopefully arrived to clear understanding of the different components of working memory, discern between short term memory and working memory, and more importantly, to show the relevance of the working memory store capacity in developing the oral aspect of the language.

### 3.1- What is Working Memory?

Psychologists and specialists in the field provided many definitions to the concept of working memory, each contributing to the understanding of that particular system. What follows is therefore, an overview of the most predominant definitions related to that notion.

For Woolfolk (2004:242) working memory is

> "the workbench of the memory system, the interface where the information is held temporarily and combined with knowledge from long term memory; working memory contains what you are thinking about at the moment".

Zimbardo (1979: 161) stipulated that short term memory is

> "the second memory system….in which limited amounts of information that the person has just learned remain in the memory for very short periods of time, probably no more than thirty seconds. This can be extended considerably if we rehearse the material; otherwise, memory starts to disappear almost at once."

Sternberg (1995: 277) about the same issue suggested:

> "Our short term memory stores hold information for matters of seconds and, occasionally, up to a minute or two. When you look up a phone number in the phone book and try to remember it long enough to dial, you are using the short term store"

Baddeley et al (2002:476), however, believe short term memory to be that system which handles information that occurs in the very recent past (Baddeley's model f working memory will be dealt with in some detail in the coming sections). On the other hand, Gathercole and Alloway (2007:4) propose that the system is thought of to be a mental workspace that handles information in the course of our mental activities like while thinking.

In her turn, Matlin (1983:476), approached the subject through providing other synonyms to the subject. She wrote:

> "Incidentally, you may find other terms that are similar to short term memory. Three of these terms emphasise the idea that short term memory consists of the information we are currently processing"

Cowan (2005:1) while raising the same issue outlined that working memory refers to the relatively small amount of information that one can hold in mind, attend to, or technically speaking, maintains a rapidly accessible state at one time.

Dehn (2008:2) on the other hand, argued that working memory is said to be an active memory system that is responsible for the temporary maintenance and simultaneous processing of information.

While attentively considering the above working memory definitions, which are all provided by eminent figures in the field, one is systematically attracted by a certain kind of similarity between the authors' viewpoints about the topic in question. Despite the fact that each proposes his/her own definition in a different way, the core of the matter is basically the same. For, all the authors agreed that at least on one or two characteristics are related to working memory. One is related to its capacity whereas the other is related to the duration of knowledge in the system. Concerning working memory capacity, the psychologists shared the same view that it is very limited, and of very short duration. As for the duration of knowledge in the system, they all agreed that it could be held there for a while, a short period of time, a maximum 30 seconds or simply temporarily.

Therefore, on the basis of these two characteristics, among many others, one can formulate a definition of working memory; which could be seen as a very limited repertoire that keeps a particular kind of knowledge for a while. The latter definition, although precise and concise in purpose as well as in meaning, still raises further interesting questions like:

•What is the nature of the particular knowledge generally held in working memory?

•If the knowledge is kept for a while, does it mean that it will be out of the system (forgotten), or is there a way to keep that knowledge active in the system?

In fact, answering these questions has been for the recent decades the central point of research in the field of memorization in general. All psychologists suggested different estimations that converge to meet on one central point: working memory is a small store responsible for temporarily retaining a specific kind of knowledge. The following section is therefore a literature review about the historical background related

to investigations that aim at finding out the nature of working memory or short term memory and its functions.

### 3.2- Historical Research Background on Working Memory

To begin with, Matlin (2003:80), in an attempt to expose the historical developmental interest in working memory researches, revealed that everything started with George Miller's magical number "seven". The psychologist reported that this magical number is considered to be the first stepping stone towards modern research and investigation on working memory. Everything started in 1956when Miller declared that humans could retain only a limited number of items at once in active memory (what is now known as working memory). Maltin, asserted that Miller, in his article, The Magical Number Seven, found out that people can remember about seven items (plus or minus two). In other words, human short term memory can hold from five to nine items at once, which is still according to Miller the average capacity of our human working memory.

Matlin (2003:82) argued that the psychologists asked some people to repeat some items. At first, they were successful, yet, while trying to recall again the same thing, they failed. As if their memory system has been brutally emptied. The fact of forgetting after just few seconds has paved the way to a new innovation in the same research field: it was about how to keep entering knowledge to working memory for a longer period of time.

Matlin (2003:82), then raised the issue of a technique carried out by Rundus in 1971 and which came to be known as the recency effect. It is a method which consists of showing up the relevance of a word's position in a list with its probability of recall. It has been noticed that the last item in a given list of words is likely to be recalled

compared to the prior items. Later on, the recency effect theory has become the best method to measure working memory capacity. The same author argued that the recency effect developed to be what is commonly called memory span, an interesting method to measure the size of working memory through counting the number of items that could be appropriately recalled in the same order they have been provided in a given list.

Next, Matlin (ibid) approached the famous theory of Atkinson and Shiffrin when they proposed the three store model making the memory system, and in which they assumed that working memory is a separate system whose information would be inevitably lost if it is not repeated. At last, Matlin (2003,85) exposed the most recent overview of memory as put by Baddeley, who first provided a model of working memory made of three components: the phonological loop, the central executive and the visuo-spatial sketchpad, each of which assures a specific activity and largely contributes to facilitating the role of the other constituent.

### 3.3- Basic Characteristics of Working Memory

To approach the issue of working memory capacity, Cowan (2005:1) began his explanation with the following precision:

> "The feeling of being overwhelmed by a lot of information can occur because of the special type of memory that is typically termed working memory. It refers to the relatively small amount of information that one can hold in mind, attend to, or technically speaking, maintain in accessible state, at one time."

The above quotation can summarize all the most important characteristics of working memory. First of all, it indicates that it holds just few information at once, otherwise, there is a risk of loosing that same information from the system. Second, the fact of being able to retain just few information implies the idea that this store's capacity is small or very limited. Third, the presence of this information in working memory is temporary or very short. Finally, most of the information present in working memory is technically used for speaking i.e, the kind of information hold there is basically acoustic (sounds) and needs to be retrieved quickly to be able to produce speech with the pace humans generally do. Therefore, and in the light of what has been deduced so far, we can list the major principles characterizing working memory, which are:

- It has a very limited capacity.
- It can hold information for just a short period of time.
- It can hold a specific number of items at once; otherwise, the individual would feel uncomfortable leading to a total loss of information.
- It is the key memory store responsible for speech production.

**3.4-Working Memory Capacity**

Zimbardo (1979:162) believes that the capacity of working memory is one of the most relevant principles characterizing that specific memory store. Like most psychologists, he stipulated that its capacity is not very great. He further put that, in addition to this capacity limitation, there is what the author called overloading. By the latter notion, Zimbardo meant that working memory store contains information beyond its capacity. In such circumstances, the information would be pushed out of the system.

As if, to accommodate the newly entering information, the system would displace the older information leaving space for the new one. Again, this is another proof that working memory capacity is very limited.

Woolfolk (2004:246), while tackling the same concern, declared that because of the very small capacity of working memory, forgetting at the level of this store is very common. She claimed that there are two main reasons for forgetting at this particular level. It could be because of interference or decay. The former (interference), is believed to be that mental state where working memory is full, and the system still receives new information. In such case, and because of the unavailability of space, the new information takes the place of the old one. The latter, however, and still according to the same author, is the result of not being attentive enough to the information getting to the system. This inattention would cost to the whole system the weakening of the activation level. The information cannot be activated and therefore, it completely disappears from the system causing a forgetting state.

Our assumption about working memory capacity is that at the level of this store, the items that could be retrieved are the most recent ones (new entering information), and if not well rehearsed or repeated, it would be completely lost from the system.

### 3.5- Duration of Knowledge in Working Memory

To explain the notion of the duration of knowledge in working memory, Bernstein (2015:188) started his survey by asking a question: why people can't remember each phone number ever called or every conversation one ever had? The author, then directly linked this fact to the nature of working memory itself in which information is supposed to remain for a very short period of time after which it would be lost if not rehearsed.

Cadwell and Flaganan (200:6), on the other hand, and in trying to clarify the same issue, instantaneously provided a definition to the term "duration". For them, I means how long the memory lasts, précising at the same time, that short term memories do not last for a very long time. Plotnik and Kouyoundjian (2013:242), instead of providing an explanation to what time duration in working memory means, put forward a strategy of how to keep information in the working memory system for a longer time. He advocated that rehearsal is the process that assures the remaining of knowledge in short term memory for a longer period of time. The latter process, still according to the authors, is said to be the one which involves the repletion of the same items many times to assure it active presence in the system. At the same time, the author asserts that while rehearsing, no further information is allowed to get in the short term memory, assuring that working memory cannot perform two tasks simultaneously: either the information is in the system (in which case it is quickly used and then cast out from the system), or rehearsing the available knowledge (in which case we repeat the available knowledge and keeping it for a longer period of time without permitting further information to get in).

### 3.6-The Nature of Knowledge in Working Memory

To approach such an issue, we have first to illustrate the major components making up the working memory system, taking into account the fact that each is responsible for handling a specific kind of knowledge. Baddeley, Eysenk and Richardson (2009:44) proposed a multi-component model as shown in the following diagram;

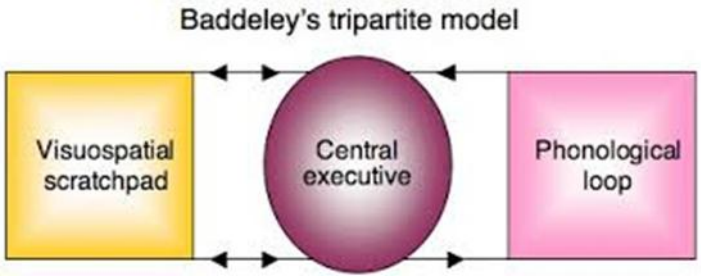


**Figure 3.1: Baddeley's WM Model (1999:49)**

### 3.7- Components of Working Memory

As it is noticed the model is threefold: a phonological loop, a central executive and visuo-spatial sketchpad, each contributing to either process or store a particular kind of knowledge or to perform a specific mental activity.

### 3.7.1- The Phonological Loop

Baddeley, Eysenk and Richardson (2009:44) suggested that the phonological loop is a model of verbal short term memory which assures a temporary storage and a verbal rehearsal process. On the other hand, Eysenk (2004:296)) proposed that the same component is the one which holds information briefly in a phonological (speech-based) form. Saito in Gathercole (2001:313), however, stipulates that the articulatory or the phonological loop is a system for retaining phonemic information. Besides, it comprises a phonological store and an articulatory control process. Matlin (2003:93) provided that the phonological loop stores keeps a limited number of sounds for a very short period of time whereas Woolfolk (2004:243) agreed that the component is a part of working memory used for rehearsing sounds and words.

Therefore, and in the light of what has been mentioned in the previous section, we are by now able to assume that the phonological loop is the verbal component of

short term memory responsible for keeping sounds (acoustic knowledge) usually used while speaking.

### 3.7.1.1- Structure of the Phonological Loop

Baddeley (1997:52) proposed that the phonological loop basically consists of two major sub-components:

-An articulatory control process based on inner speech and primarily linked to speech production.

-A phonological store responsible for keeping speech-based information and directly concerned with speech perception.

Thus the phonological loop could be considered as the verbal component of working memory whose major role is to handle and manipulate knowledge acoustically, and without which any speech-based information would be perceived and no language would be verbally produced.

### 3.7.2-The Visuo-Spatial Sketchpad:

It is another component of working memory whose function is similar to the phonological loop, yet, unlike the latter, it is supposed to deal with pictorial information, i.e, there is another kind of information which is not phonological, but, which needs to be processed at the level of short term memory. Data that is not heard (not phonological) but which is seen (visual) is better stored when the individual associates that particular seen information (visuo) with its position (spatial). (Moxon,2000:20)

Eysenk and Keane (2000:160), in an attempt to explain what the visuo-spatial sketchpad really is, argued that although the latter component characteristics are not as clear as the articulatory loop, it is still used in the temporary storage of spatial and visual information. This fact also stipulates that both components of short term memory (the phonological loop and the visuo-spatial sketchpad) have some criteria in common (temporary storage and manipulation of knowledge), and some others in which they differ (the nature of the stored knowledge; phonological or visual). In other words, the articulatory loop is responsible for storing and handling acoustic knowledge whereas the visuo-spatial sketchpad stores and manipulates visual knowledge.

Nairne in Weiner (2004:436), tackling the same issue, put forward that the visuo-spatial sketchpad is the component in short term memory principally responsible for controlling the visuo-spatial material processing and retention.

All in all, all the above explanations converge to meet on one central point, which is: the visuo-spatial sketchpad is that component of short term memory which, unlike the phonological loop that manipulates acoustic knowledge, handles and stores pictorial information in the system.

**3.7.2.1-Structure of the Visuo-spatial Sketchpad**

Eysenk and Keane (200:160) advocated that the visuo spatial sketchpad consists of two major sub-components:

-The visual cache; basically in charge for storing visual form and color information.

-The inner scribe, which is behind dealing with spatial and movement information. It has many other functions like:

1. It rehearses information in the visual cache.

2. Transfers information from the visual cache to the central executive.
3. It is involved in the planning and execution of body movements.

**3.7.3-The Central Executive:** Baddeley in Gathercole (1996:12) suggested that the central executive, a third part of short term memory is:

> "The most complex and the less understood component of the working memory model. It is assumed to be an attentional processor that serves as an interface between the slave systems and long term memory."

On the other hand, Gathercole and Alloway (2008:10) defined the central executive in short term memory to be very important since it is involved in all mental activities related to coordinating both storage and mental processing in many classroom activities. As for Eysenk and Keane (2000:162), they argued that the central executive is the most imperative component in short term memory which acts as an attentional system. Matlin (2003:107), however, suggested that the central executive is the component in working memory that integrates information from the phonological loop and the visuo-spatial sketchpad as well as from long term memory. Besides, the author advocates that it is very essential in attention, selecting strategies and making plans.

To sum up, all the provided description and interpretations about the central executive agreed at least about one point: the component in question controls attention. Furthermore, it acts like a mediator between the visuo-spatial sketchpad, the phonological loop and long term memory. Wollfolk (2004:244), summarised the functions and mental activities in the central executive as follows:

1. It initiates control and decision processes.
2. It is responsible for reasoning and language comprehension.

3. It transfers information to long term memory via rehearsal.

### 3.7.4-The Episodic Buffer:

It the fourth and new component of short term memory that Baddeley added in 2000 to the original working memory model of Baddeley and Hitch of 1974. For more illustration, Baddeley (2007:148) wrote:

> "It is a temporary storage system that is able to combine information from the loop, the sketchpad and long term memory, or indeed from perceptual input, into a coherent episode."

Baddely, Eysenk and Anderson (2009:56), however, stipulated that the episodic buffer is that component in short term memory assumed to be a storage system that can hold about four chunks of information in a multidimensional code. Therefore, the two definitions seem to agree about the fact that the episodic buffer has the ability to integrate information from different sources into one meaningful unit. Shallice and Cooper (2011:278) summarised the episodic buffer activities in the following points:

- It enables long term knowledge to reconstruct received material from other buffers.
- It also allows the integration of phonological, syntactic and pragmatic knowledge into a coherent episode.

To conclude, this section, working memory is assumed to be a multi-component model, each of which performs a specific task and stores a particular kind of knowledge. Thus, in addition to the central executive that is considered as an attentional and controlling system, and the episodic buffer that coordinates the functioning of each,

the articulatory loop and the visuo-spatial sketchpad are the components that are responsible for the temporary storage of two types of information:

1. An acoustic knowledge in the phonological loop.
2. A visual information in the visuo-spatial sketchpad.

### 3.8- Short Term Memory Processes

It is apparent, by now, that knowledge processed at the level of short term memory is basically acoustic. This also implies that the same system makes use of different mental activities to assure the good handling and manipulation of knowledge. Amongst these mental activities and processes, there is encoding, storage, and retrieval…

**3.8.1-Encoding:** As seen in the previous chapter, encoding is that ability of the memory system to create a code for each entering information for an eventual storage. In fact, this notion of encoding in short term memory has become a central point of inquiry in recent decades. According to Eysenk (2005:47), psychologists started to get interested in encoding when they raised the issue of why is information is quickly lost from the working memory system. Again, it is stated in the previous chapter, that information is encoded in different ways largely depending on the nature of knowledge being handled. Eysenk (2005:47) put it clear that encoding occurs in terms of acoustic (sounds) or semantic codes. He even advocated that this is the main fact that distinguishes between encoding in long term memory and short term memory, assuring at the same time that at the level of long term memory, encoding is semantic whereas, manipulating sounds is the quite job of short term memory. Thus, and considering the nature of the present study, the

question that is to be raised now is: how do we encode knowledge in short term memory?

Sternberg and Sternberg ((2016:206) revealed that for short term memory; an acoustic code is more important than any other kinds of codes. On the other hand, Baddeley (1998:36) asserted that short term memory relies on some form of speech-based codes and that it is closely related speech production. Therefore, most psychologists agree on the fact that short term memory converts entering information into acoustic codes to be kept at its level, i.e, encoding in short term memory is basically acoustic, though Matlin (2003:99) confirmed that there is another kind of coding in short term memory, the spatial coding, which has a deep impact on accuracy on different verbal tasks.

**3.8.2-Storage:** A quick search in the Encyclopaedia of Applied Psychology edited by Spielberg (2004:57), shows that the author, to explain what storage means, related it to two further processes which are encoding and retrieval, taking into account that these are the major three mental processes usually used by short term memory to handle and manipulate knowledge. In this respect, the author writes;

> "Memory involves three main processes; encoding, the process by which information is put into memory; storage, the process by which information is maintained in memory, and retrieval, the process by which information is recovered from memory…… Storage may be long term or short term. Short term memory; or working memory, is of quite limited capacity and is used

to hold information in consciousness for immediate use"

(Spielberg, 2004:57)

From this very general description of the three processes involved in short term memory, we can say that storage involves the following characteristics:

-It is the second process in the memory system which handles incoming knowledge after being appropriately encoded.

-Storage is the process which allows the short or long maintenance of knowledge in the whole memory system.

-Storage in short term memory is very limited in terms of capacity.

-Storage role in short term memory is to keep knowledge available and easily accessed to be used immediately whenever needed.

On the other hand, Logie and Duff, in Osaka (2004:119) supposed that working memory refers to an online cognitive processing whose storage is temporary and related to a wide range of tasks. This definition also implies the notion that short term storage lasts for a while after which it will be lost from the system. Besides, the same memory system performs different kinds of tasks; probably, those as seen in the previous section, the temporary keeping of acoustic and visual information in the memory system as a whole. Woolfolk (2004:245) tackling the same issue, referred to storage in working memory through explaining how knowledge is kept at this level. She highlighted that all information present in working memory is fragile and easily lost. Thus, the only way to retain it there is through keeping it activated, otherwise, forgetting follows as a result of consequent moments

of inattention. The author then suggested that information is kept activated in working memory (and this the way the system stores knowledge) through mentally rehearsing the information.

To highlight the relevance of rehearsal in the storage process of working memory, Gathercole and Alloway (2008:5) proposed that the latter process is a strategy used by short term memory to prolong the period of the presence of knowledge there and over which information would be totally lost from the system. Rehearsal consists of repeating the material to be remembered in our heads many times until the individual is able to access it easily. The same authors put forward the effective rehearsal process is influenced by the length of the material being rehearsed, i.e, long words take longer time to be rehearsed, which is not the case of short words whose rehearsal does not take much time. Therefore, they are easily maintained in working memory compared to long words.

Dehn (2008:60), explaining rehearsal, made the distinction between two types of the same system; short term memory rehearsal and working memory rehearsal. This distinction again leads us to deduce that short term memory and working memory are quite different systems. Dehn (2008, p4) confirmed that though both of working memory and short term memory are considered to represent the same level in the whole human memory system, there are some points in which they differ, which include:

-Short term memory passively holds information; working memory actively process it.

-Short term memory is domain specific (verbal and visual); working memory capacity is less domain specific.

-Working memory has a stronger relationship with academic learning and with higher-level cognitive functions.

-Short term memory automatically activates information stored in long term memory; working memory consciously directs retrieval of desired information from long term memory.

-Short term memory has no management functions, working memory has some executive functions.

-Short term memory can operate independently of long term memory; working memory operations rely heavily on long term memory structures.

-Short term memory retains information coming from environment; working memory retains products of various cognitive processes.

The existence of such differences implies that short term memory and working memory are separable, and each can function without the other. Hence, we expect that there are two different kinds of rehearsal. Dehn (2008:70) added that short term memory rehearsal is referred to as sub-vocal rehearsal, whereas rehearsal in working memory is commonly known as verbal rehearsal. The former is believed to consist of, still according to the same author, sub-conscious and automated process then has been developed then internalized an automatized during early childhood. The latter, however, is suggested to be a conscious and effortful process.

In her turn, Woolfolk (2004:245) discerned between two other kinds of rehearsal which she labelled maintenance rehearsal and elaborative rehearsal. According to hear, maintenance rehearsal consists of repeating information in our minds many times; the more we repeat, the better the information would be maintained in working memory. Elaborative rehearsal, however, consists of creating a link between the information to be remembered with knowledge we already know from long term memory. It also enables information to move from short term memory to long term memory.

Boyle and Scanlon (2010:89) provided further information about maintenance and elaborative rehearsal through specifying the function of each one. The authors précised that rehearsal serves two major purposes: a short term use, in which case information is kept in memory for a very short period of time through repetition (maintenance rehearsal). The second one is for longer use to enable a successful transfer of information to long term memory through creating an association between the particular information and what is already available in long term memory.

To wrap up, and despite all the differences and controversies about rehearsal in working memory or in short term memory, it still serves one particular and common purpose: Keeping entering information as long as possible in that temporary memory store.

Yet, rehearsal is not the only strategy used by short term memory to keep knowledge in the system. Woolfolk (2004:245) talked about chunking, which she considers to be the individual's own short term memory capacity to group bits of information into meaningful units easy to be remembered.

Radvansky ((2015:67) reported that chunking is a way of explaining short term memory capacity when the individual is able to take bits of scattered information, create a link amongst them, and then group them together into units which is/her system can understand and handle.

Plotnik and Kouyoundjian (2013, p243), however, believes chunking to be the mental ability of working memory which enables the individual to prolong information in short term memory, not through repetition, but rather through combing separate items into larger units or chunks of information. The author also suggests that this process of chunking is a very powerful tool that enlarges the amount of information that could be hold in working memory.

**3.8.3-Retrieval:** it is, as seen in the previous chapter, that mental ability of the memory system to get back or extract already stored information for an eventual use. We also highlighted that retrieval can occur in different ways largely depending on the nature of the store (long term or short term) and the nature of the stored knowledge (acoustic or semantic). Weiner (2003:432) that since memories in short term memory are active, they are immediately available for recall, i.e, recall from short term memory is easy, effortless and direct. Nevertheless, Bernstein (2014:242) asserts that if the individual is able to successful retrieve information, it is basically due to what the author calls the retrieval cues that has to match to a certain extent some features of the encoding codes. This is just to say that retrieval from short term memory is not as complex as the one in long term memory. It is already confirmed to be effortless and direct; otherwise how could one explain the speed in which to produce accurate and appropriate sounds making our everyday language

while speaking. Since short term memory retains the knowledge related to the sounds we frequently make use of to utter speech and considering the way and speed throughout which we speak, it is obvious to guarantee that retrieval from short term memory is quick, effortless and immediate.

### 3.9-Forgetting in Short Term Memory

A common definition of forgetting would be that inability to remember a given information. In more technical words, forgetting is the loss of information from the whole memory system. In the previous chapter, however, it was stipulated that forgetting is the result of retrieval failure.

Sternberg (1995:278), in explaining the reasons behind forgetting at the level of short term memory, began his overview by asking an interesting question: why do we forget a phone number or the names of people at a party after a brief period of time? In fact, most of as have been at least once or twice subject to such an unfavourable circumstance. We try to recall a friend's phone number given to us few moments ago, and which we thought has been well kept, but in vain. Sternberg called this situation short term memory forgetting. He argued that psychologists formulated many theories to explain the issue, yet interference theory and the decay theory seem to be the most pre-dominant ones.

#### 3.9.1-The Interference Theory

Sternberg (1995:278) suggested that this theory is based on the premise that forgetting occurs because information interferes with and ultimately displaces old information in the short term store. In other words, and because of the very limited capacity of working memory, overloading the repertoire of the latter store would lead to interference of new information with the old one to the extent that it takes its place and

resulting in loosing the former knowledge from the system . The author, then made the distinction between two types of interference that generally occurs in working memory. These include retroactive interference and proactive interference.

- **Retroactive interference:** It is mainly caused during the interval of learning something and before asked to recall that thing. For instance, asking someone to remember a phone number, and before giving him/her the opportunity to recall that same number (rehears it), we provide the individual in question with more information about the owner's phone number. This new information, which has nothing to do with the digits of the phone number, would interfere with the newly acquired digits and thus diminishing the probability of remembering the information we learnt previously.
- **Proactive interference:** It is, as put in Sternberg's (1995:279) own words "when the interfering material precedes the to-be-remembered material. To clarify that issue, Eysenk (2004:307) proposed the following example: proactive interference is well illustrated through the individual's inability to remember where the keys are put if their usual place is changed. Eysenk further added that this kind of information is the result of two major reasons:

-It might be due to the great strength of the incorrect response learned initially, or

-It could be due to problems in retrieving the correct answer. In our case example, it is rather related to the first option, since the strength of the incorrect answer (the usual

place of the key) is so considerable to the extent that we are unable to remember the least shadow of the new place of the keys.

### 3.9.2-The Decay Theory

Woolfolk (2004:246) suggests that the decay theory is primarily due to inattention, which would definitely lead to weakening the activation level in working memory until it completely drops and information cannot be re-activated again. Cadwell and Flanagan (2003:22), on the other hand, believe that decay means that the trace of the memory simply disappears and cannot be re-extracted back. In his turn, Sternberg (1995:280) assured that the decay theory stipulates that the loss of information occurs because of the gradual disappearance of the memory trace. Thus, the three psychologists, agree that, unlike interference theory, in which forgetting is due to information displacement and confusion with old knowledge, the decay theory advocates that forgetting is the outcome of the gradual weakening of the memory trace (and which could be due to many factors) until it is completely lost from the system.

## 3.10- Individual Working Memory Differences and Language Learning

After covering different theoretical issues related to working memory, it can be assumed that the latter system is a memory store responsible for temporarily keeping acoustic information to be used whenever needed. It has been even showed that it is due to rehearsal if knowledge presence in the system is prolonged. Besides, it was highlighted that its capacity is very limited and is able to just retaining a given amount of information beyond which overloading and then forgetting would occur. Yet, what is curious about all that is, regardless to its little and limited capacity, does the latter store differ from one person to another, and does it influence the learning of a foreign language.

Robinson (2013:251) claimed that learners with higher working memory capacity are more likely to notice novel forms in the input, especially those which are redundant compared to lower working memory capacity leaners. On the other hand, Dehn (2008:98) stipulated that in oral language comprehension, working memory plays the critical role of constructing and integrating ideas from a stream of successive words. i,e; to understand the meaning of a whole sentence, we need to remember the previous words in order to relate them with later words. Thus, the two point are in the direction of our hypothesis that the larger working memory is, the better language acquisition and therefore production would be. The author also assures that a larger working memory capacity implies holding much knowledge in the store. As for language production, we need to keep the knowledge related to language we produce while speaking active so that we can easily link it to the later coming words, a task commonly performed by working memory.

### 3.11- Improving Working Memory

After having exposed through different psychologists' point of views and investigation the relevance of working memory in learning a foreign language (speaking in particular), it is quite logical to think about ways of how to make sense of short term memory functions and specific characteristics in order to facilitate the language acquisition process for learners.

In their book "Reaching your Potential: Personal and Professional Development", Throop and Castellucci (2004:54), revealed some ways and techniques contributing to improving one's working memory. These techniques include repetition and organization. The authors claim that the best way to keep knowledge for a longer time in short term memory is through repetition. In other terms there is no better way to

prolong the presence of knowledge in short term memory than going over it again and again in your head or even out loud. In fact, this helps in maintaining information for a longer period of time in that temporary store. The other technique, however, is organization, which is, still according to the same authors, that possibility to organize knowledge in working memory through chunking (though organization seems to contribute much better to improve long term memory rather than short term memory). Chunking, as seen previously, is to combine the available knowledge into seven or fewer meaningful units, a way which has been proven to be one of the best methods to extend the presence of particular information in short term memory. Bernstein (2011:218) shared the idea that chunking is an efficacious technique to enhance working memory. He argued that children's short term memories improve because of their gradual ability to create as many as chunks in memory. Thus, this chunking training leads children to develop their performance at grouping information into chunks. In his turn, Zimbardo (1979:181) stresses on chunking as a way to facilitate knowledge retention in the system, yet, he put more emphasis on the number of units or chunks that should be memorized. He put forward that our ability to recall largely depends on the number of organisational units. He even drew attention to miller's magical number, seven plus or minus two pieces of information. i,e, a successful knowledge retention in short term memory is the result of aproper chunking process (organising and combining items bits of information into meaningful and understood units to be stored in the system), nevertheless, the number of items should not go below five nor should it exceed nine pieces regardless to the form of the unit: large or small; complex or simple.

### 3.12- Implementing Working Memory Strategies in a EFL Classroom

In the previous sections, we have exposed different thoughts and point of views related to short term memory capacity and its eventual contribution to the development of language production, speaking in particular. Moreover, a number of studies have shown that memory related strategies can considerably contribute to foreign language proficiency. Oxford (1939:39) outlined that:

> "memory strategies reflect very simple principles, such arranging things in order, making associations and reviewing. For the purpose of learning a new language, the arrangement and associations must be meaningful to the learner, and the material to be reviewed must have significance".

Thus, the author insists on the fact that to assure a good use of memory strategies, knowledge should be presented to the learners in a way they can understand, or at least, using concepts that are useful and meaningful to the foreign language learner.

On the other hand, memory strategies implementations in the classroom require making sense of the learning process through a good exploitation of the major characteristics of the memory system like storage and retrieval. In that respect, Oxford (1990:58) confirmed this when she argued that storage and retrieval of new information are the two key functions of the memory strategies. The author (ibid) then propose a set of memory strategies she judged crucial to language acquisition four skills. These memory strategies involve:

- Creating mental linkages
- Applying images and sounds

- Reviewing well
- Employing actions

Then; shefurther subdivided each of these into sub memory strategies:

- **Creating Mental Linkages:**
    - Grouping
    - Associating-elaborating
    - Placing new words into a context
- **Applying Images and Sounds** include:
    - Using imagery
    - Semantic mapping
    - Using keywords
    - Representing sounds in memory
- **Reviewing Well** involves:
    - Structured reviewing
- **Employing Actions** includes:
    - Using physical responses or associations
    - Using mechanical techniques

Again, and because of the nature of the present research which targets the issues of making sense of the memory strategies while speaking, Oxford (1990:37) highlighted that the strategies we are concerned with are:

- Placing a new word into a context
- Representing sounds in memory
- Reviewing well

**-Placing a New Word into a Context**

This strategy involves the idea of putting new words or expressions that have been read or heard into a meaningful context. This strategy is very efficient in enriching learners' vocabulary, the fact which would result in a fluent and varied speech.

**-Representing Sounds in Memory:**

To explain what this strategy is meant for, Oxford (1990:63) wrote:

> "This strategy helps learners to remember what they hear by making auditory rather than visual representation of sounds. This involves linking the new word with familiar words or sounds from any language: the new language, ones' own language, or any other language".

The quotation is meant to explain further memory speaking sub-strategies commonly used to enhance the learners' speaking performance, which involves, according to Oxford (ibid), rhyming and creating oral associations between the new word and other words having the same acoustic characteristics in the target language or any other language the learner knows.

Oxford (1990:63) suggested that rhyming is the best strategy we use to represent acoustic knowledge to memory. This strategy helps a lot in remembering items having the same acoustic characteristics (rhyme) like: night, flight, sight, light, fight ….

As for the second strategy, the author argued that being able to find an acoustic association between the new vocab-item and another one, even if it does not have the same meaning in his mother tongue, target language or any other language he knows. A good illustration of that is the one exposed by the author herself: To link the new Russian word *gazyeta* with the English word *gazette (*both words sound alike and have

the same meaning too). We can provide another example from our own Algerian context like establishing a link between the English word *coffee* and the Arabic word ……..which basically have the same acoustic characteristics and the same meaning.

**-Reviewing Well:**

According to Oxford (1990:66), this strategy is the only one aiming at remembering new material in the target language. Its objectives are those of learning and then reviewing and revising the learnt material at different interval to check our ability in remembering how much content. As an example, learning by heart a list of words, and then practicing them immediately. We keep repeating after different periods of time until the material become more or less automatic. In this case, and after reaching a good level of mastery of the vocab- items, the learner, instead of keeping repeating the list of words, he can employ them in meaningful and complete sentences.

However, relying on just memory strategies to remember knowledge is not the only way to develop one's oral proficiency. Jordan et al (2008:48) believe that learning involves effective ways of building schemata and processing information. Therefore, and regarding the nature of the present paper, we should focus on the system itself: short term memory.

Besides, speaking, as part of the whole language learning, if well related to working memory functions, one may find that both are subject to specific factors that constitute the main framework of the present study. These factors include: perception, attention, and short term/working memory characteristics.

**-Perception**

Woolfolk (2004:240) stated that perception is the process of detecting a stimulus and assigning meaning to it. In addition to that, it is the firs step in knowledge processing in the memory system. In this respect, Jordan et al (2008:49), presented a number of techniques for an effective knowledge perception which involves:

- Arousing perceptual interest with strongly defined material;
- Emphasise the distinctiveness of material in processing
- Point out patterns in materials
- Present material in a structured form (diagrams or stories)
- Place learning in a context and take contextual factors into account
- Review knowledge and assist learners to see relationships between old and new
- Explore attitudes and emotional responses to topic and deal with any negativity

However, for knowledge to be well perceived, learners need to be attentive. Thus, attention is also of relevant significance in the processing of knowledge, for we all know that it is impossible to remember something we do not pay attention to.

Woolfolk (2004:241) wrote that attention is the first step in learning. Again, Jordan et al (2008:50), in an attempt to illustrate the role attention plays in the processing of knowledge in the whole memory system, and working memory in particular, they suggest that teachers should:

One can notice what the authors proposed about attention has something to deal with motivation. i.e. to attract the learners 'attention the teacher should present motivating stimuli. Brown (1987:114) gave a purely cognitive explanation to the topic when he defined it as 'an inner, drive, impulse, emotion or desire that moves one to a

particular action.' In fact, he concentrated mainly on exposing one type of motivation which is the one commonly known as 'intrinsic motivation. The latter is, as put by Fantana (1995) the result of a natural curiosity drive in both animal and man. This drive, which develops throughout the individual's life, is not directed towards an apparent material end, but rather it plays the role of an innate stimulus that always actuates exploration and discovery from the very early phases of life.

Subsequently, and still according to Fantana, the fact of responding to that drive implies the idea that the latter continues developing. Still, in case this response is met by adults' dissatisfaction and rejection, this probably would create a feeling of resentment or apathy. Motivation in this case is, therefore, hindered and disinterest is going to emerge as a consequence to that external psychological obstacle. On the other hand, if children performances are met with adults' approval and encouragement, they inevitably would develop a certain kind of interest in the task they are engaged in. Their curiosity to discover is going to be more reinforced, hence more qualitatively and quantitatively productive.

Yet, what is the relationship between motivation and attention? Keller (2010:76) strongly believes that learners' attention is closely related to motivation. The author posited that the objective of the teacher is to know how to direct learners' attention to the concepts, rules, skills, or facts to be learnt. Hence, much of the teachers consideration is to know how to appropriately select cues, due to which learners could concentrate an pay attention. If this fact is fulfilled, learners would find no difficulties in the retrieval process.

Jordan et al (2008:50), tackling the same issue, proposed the following clues as a way to maintain learners' attention. These include:

•Arouse initial interest by novelty and departure from the expected

•Present the subject in an interesting way

•Vary teaching methods with exercises and activities that maintain interest

•Promote active listening in lectures and presentations

Coming to the most important point, which is short term memory, we have already settled down throughout the theoretical chapters that the latter store is limited in both capacity and duration. Jordan et al (2008:59); taking these two facts into account in a foreign language classroom, suggest that the teachers should:

- Limit the number of lists or items to be committed to memory at one time
- Be aware that learners remember first and last items on a list better than central ones
- Group items into chunks with less than ten item to be memorized at one time
- Be conscious of interference between different types of information to be learnt
- Use repetition or maintenance rehearsal to retain information for a short period

Concerning working memory, we have proved that it has slight differences from short term memory (see previous sections). Amongst those differences Dehn (2004:4) suggested that working memory is active whereas short term memory just passively keeps a given types of knowledge. In this regard, and taking this very special characteristic distinguishing short term memory from working memory, we found the ticks provided by Jordan et al (2008:51) very interesting and beneficial in an English

language classroom, since it gives hits of how a teacher can make advantages of the very basic characteristics of working memory. These ticks include:

- Tell learners which information is more important
- Begin with an overview or outline of the material to be learnt
- State the objectives of learning outcomes
- Develop automaticity and speed in response in learners through regular practice
- Encourage learners to use the knowledge they already possess
- Encourage reflection and meta-cognition
- Link difficult –to- remember items to more meaningful ones
- Encourage visualization-use image representations
- Use verbal memory aids such as mnemonics
- Use mind-mapping techniques
- Use guided questioning to activate existing schemata and concepts
- Match encoding strategies with material to be learnt
- Understand that learners need to make schemata explicit and challenge their own assumptions
- Present content in increasing order of complexity
- Revisit topics to strengthen retention

Moreover, the authors urge that encoding is the process of organizing material and making it meaningful in working memory. It allows to place this knowledge (generally acoustic knowledge) permanently in long term memory. Thus, to activate working memory, teachers should:

- Link materials to cues that can be used to recall them
- Remind learners that cues are sufficient to recall the material
- Encourage learners to create their own cues
- Teach revision techniques
- Encourage learners to discover and use their strengths and styles.

**Conclusion**

This chapter presents a theoretical support to the nature of working memory and its relevant contribution to learning a foreign language in general and producing speech in particular. To achieve those objectives, many definitions of the issue have been provided, the purpose of most of which is to sort out one common explanation to working memory that compromises most psychologists' opinions. Besides, the psychologists' gradual interest in studying and investigating that particular system was exposed, especially after it has become apparent that it plays a vital role in many human faculties development (language acquisition as an example).

Therefore, notions like the phonological loop, the visuo-spatial sketchpad, the central executive and the episodic buffer have been dealt with in details. This is willingly done to stress on the function of each, highlighting at the same time the articulatory loop as the verbal component in working memory responsible for language production.

Since working memory is a store that is meant to temporarily keep knowledge, an overview about the nature of the knowledge to be retained there and the way it is manipulated and handled by the different short term memory processes was scrupulously displayed, encompassing: encoding, storage and retrieval.

Moreover, regarding the focus of the present study, the researcher tried to create a link between memory capacity and an eventual contribution to developing oral proficiency through the exposition of how could individual differences in working memory capacity contribute positively or negatively in language production. Finally, all those findings were supported by demonstrating some of the techniques, most psychologists agree about, to be efficacious in developing and improving working memory: repetition, organisation, and chunking.

# Part II:

# Fieldwork

# Chapter IV:

# Measuring EFL Learners Working Memory Capacity

## Chapter IV: Measuring EFL Learners Working Memory Capacity

## Introduction

This part presents the empirical research findings of our experimentation conducted in the Department of English at the Teacher Training School of Constantine, in an attempt to show the extent to which the already stated research questions as well as hypothesis are in the right direction. A non-word-repetition test was therefore applied, and then the results were analysed to achieve the already stated objective.

As was stated in the theoretical part of the present research, many investigations have been carried outto illustrate how memory can influence the process of foreign language learning. Consequently, psychologists provided reviews about memory and its different components contribution, especially after it has become apparent that any success in foreign language learning is basically attributable to memory capacity. Therefore, to talk about the contribution of the whole memory system in language production, one ought first to identify what part of that system is responsible to the fulfilment of the task. Then, it would be possible to draw the link between working memory capacity and foreign language learning.

As it was observed along with the theoretical chapters, the memory system comprises three basic components: the first one is about a sensory register, which is, in its turn, constituted of three further sub-parts: iconic (visual), echoic (auditory) and haptic. The primary objective of the sensory store is just confined to perception. The second component, however, is the short term memory or the working memory, a common and very limited store that is responsible for keeping information acoustically. At last, there is the long term memory whose role is to permanently store three kinds of information: The first class of information is the understood and meaningful one, which is stored in semantic long term memory. The second set of information is about specific

events about our lives and it is stored in episodic long term memory. The third sort of information, however, is the one related to particular tasks and skills that are commonly stored in procedural long term memory.

Since the practical focus of the present study is to highlight the relevance of memory in speech production, the emphasis would be therefore directed to working memory because it is the one responsible for temporarily keeping sounds which are used while speaking.

Thus, the present study aims at showing the relevance working memory capacity has on fostering a foreign language learner speech. One significant question that would be raised in this respect is why to concentrate on short term memory and not the other types of the memory system. For Baddeley (1999:36) many experiments, mainly the one carried out by Conrad (1964) proved that short term memory relies on some acoustic codes while processing knowledge. By the end of his own experiment, Baddeley was able to say that short term memory is particularly closely related to speech, which is not the case of long term memory that handles knowledge in terms of its meaning; nor, is it the case of sensory memory, whose major function is confined to just perception. Furthermore, Ellis (1996:18) reported that working memory capacity has a great impact on learning the grammatical rules of a given language. Finally, Speciale, Ellis and Bywater (2004:25), while conducting an experiment on undergraduate university students; found that both phonological sequence learning ability and phonological short term memory capacity largely contribute to vocabulary learning. All in all, the sum of the three statements points to basically one conclusion: there is one component in short term memory system that is responsible for handling information phonologically, and the capacity of which is believed to be a major cause

for a successful foreign language learning. Baddeley, Gathercole and Papagno (1998:158) called that verbal component of working memory (referred to by most psychologists as the phonological loop), a language learning device.

Baddeley (1999:49) proposed a model of working memory made of three elements: the central executive, which he qualified to be an attentional control system that is supported by two further sub-components: one is verbal, the phonological loop, and the other one is visual commonly known as the visuo spatial sketchpad. Therefore, one may deduce that the phonological loop is that verbal component of short term memory that is responsible for keeping trace of spoken knowledge using the process of rehearsal. Subsequently, the focus of this study could be reformulated to be related to showing the role of verbal working memory capacity, or the phonological loop, in developing the individual's speaking skill.

Another equally important insight that should be questioned too is why precisely verbal working memory. In fact, it is widely assumed that to recall information at the level of short term memory, one needs to rehearse using sub-vocal speech, a role commonly performed by the phonological loop or the articulatory loop, which is the verbal component of short term memory. Baddeley (1999:57) argued that the phonological loop capacity may be an important determinant of foreign language acquisition rate, and that a good non word repetition performance indicates a good memory system, which in its turn leads to good vocabulary acquisition. By the end, the author concluded that the phonological loop is the system that evolution has developed for the crucial task of language learning.

Ellis (1996:112) claimed that working memory as measured by non word repetition test is the best predictor of success in L2 learning. On the other hand, French

(2006) stipulates that the simple best predictor of success in learning English at school is the children's accuracy in repeating unfamiliar non words. Eden and Flowers (2008), however reported that non-word repetition tests are basic tools to predict capacities of phonological memory.

On the basis of what has been said so far, the researcher will try to apply the "non-word repetition test" on a population of adult students in Algerian universities studying a foreign language (c.f the section on methodology), in an attempt to highlight the contribution of working memory capacity in enhancing foreign language acquisition in general and fostering the development of the learner's speaking skill in particular. In our case, the language we are concerned with is the English language.

The population itself would involve two sets of students that are chosen on the basis of their academic scoring along their university tests and exams. Thus, we will have a group of high achievers and another group of low achievers. Two similar sets of tests would be administrated to both groups in an attempt to prove that working memory capacity is very influential in English language acquisition. The expectancy is that high achievers would be able to remember more words compared to low achievers. We assume that high achievers, who are characterised by a very good mastery and fluency in producing the spoken form of the language, have a larger working memory capacity compared to low achievers whose failure in remembering words is theoretically due to their small working memory capacity.

Again, this study addresses the research question about the relationship between verbal working memory capacity and performance, and the consequent effect on fluency in English in fourth and third year students in the Department of English at the Teacher's Training School of Constantine.

To examine the feasibility of the non-word repetition test, the researcher resorted to the use of a pilot study to decide how and whether to launch the full scale project or not.

### 4.1- Research Questions and Hypothesis

Throughout this particular experimentation, the researcher intends to stress on the very specific and exclusive role of the working memory capacity in determining learners' ability to develop their oral proficiencies. Hence, this investigation, consisting chiefly of a pilot and a main study; targets the following research question:

- How could working memory capacity be linked to foreign language fluency?

Answering this question will inevitably help to see the extent to which the suggested hypothesis is in the right direction; i.e, if learners' working memory capacity is large enough to contain the needed knowledge contributing to speech production, learners would find no difficulty to express themselves in the target language.

This also could help in providing solutions and developing techniques and methods of how to teach EFL learners having difficulties in speech production in Algerian contexts taking into account the particular characteristics of their working memory capacities.

### 4.2-Pilot Study

#### 4.2.1- Method and Design:

**a-Participants:**

Forty five students in the Department of English in the Teacher Training School of Constantine (out of 150 students of the whole population of the academic year 2013-

2014)) participated in the experiment. Their age varies from 20 to 23 years old. All have undergone similar English studies content in the department of English of the school for three and four years, basically with the same teachers and in the same educational context. A brief interview with them concerning their social background, previous studies and schooling, revealed that most have the same social class characteristics, whereas their studies in primary, middle and high phases were carried out in public schools; i.e. academically speaking, they are all the product of the same Algerian educational system. As for the English studies, all of them declared that they began learning the English language after finishing the primary school phase (this phase is commonly referred to in the Algerian educational system, as première année moyenne). We have first to stress on the fact that the pilot group (45 students) consists of 5males and 40 females. They were randomly chosen to make sure that all students under investigation (high and low scorers) have equal chances of being selected.

**b-Measurement**

To assess the 45 participants' short term memory capacity, we resort to the use of the non-word repetition test. This latter is based on the premise that subjects have to repeat a list of meaningless words, and in our case, they are asked to repeat a list of non-sense words in a particular order.

The so called list of non-sense words is constituted of mono- syllabic, two, three and four syllable words that are arranged in a random way (without caring to arrange them in accordance to their length).

A non-word repetition test, in its simple definition, is a measure that is commonly used to assess the capacity of subjects to repeat non-sense words and observe

the extent to which these latter are able to temporarily store information phonologically, the thing that is linked to the verbal working memory , which is the basic scope of the present investigation. The same test is also applied to assess the subjects' visual working memory capacity which is primarily linked to another component of the short term memory which is the Visio-spatial sketch pad.

Subsequently, along with this experiment, principles of the non-word repetition test (repeating a sequence of non-sense words in a particular order) are implemented in an Algerian educational setting to achieve the objectives of the following study. Knowing that similar tests targeting the same objectives at different levels (children, adolescents and advanced level learners) have already been carried out in other contexts like:

- Baddeley (2003) from Bristol University (working memory and language: an overview)
- Gathercole et al (2005) in Uk (Developmental consequences of poorphonological short-term memory function inchildhood: a longitudinal study)
- Mizera (2006) from Pittsburgh University (Workingmemory and L2 oral fluency), a thesis directed by Dr Allan Juff.

**c-Procedure**

The 45 students are received in the traditional learning classroom, where they used to have their usual course, and have not been told about the test. The classroom is equipped with a camera to videotape the whole procedure including the students' reactions towards the list of words they are supposed to repeat.

The whole group was gathered in order to explain them what isthe test about. Then, they are asked to leave the room knowing that they will be received in pairs.

Once in the classroom, each pair receives further explanation about the test: they are told that the test consists of repeating a list of fourteen words in the same order provided in the paper. they are also supposed to read that list for three minutes before repetition. The allocated time for repetition is believed to be sufficient for all learners of different cognitive capacities to remember the content of the list.

The experiment lasted for four hours within two days. The students' performance was assessed on the same paper they read. When they are no longer able to remember a word at a given level, they have to stop repeating. The last correctly repeated word is underlined, and then the students are asked to continue saying the words they were able to recall even in a disordered way.

**d- Analysis and Interpretation**

The analysis of this experiment is divided into three phases.

**-Phase 01**

First, the number of students who were able to remember only some words and then stopped at a particular level was counted and the results were tabulated, and then translated in a graph.

| Number of words | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of students remembering only | 0 | 3 | 13 | 10 | 5 | 2 | 0 | 6 | 2 | 1 | 1 | 1 | 0 | 1 | 45 |

**Table 4.1: Students' VWM Capacity of the Pilot study**

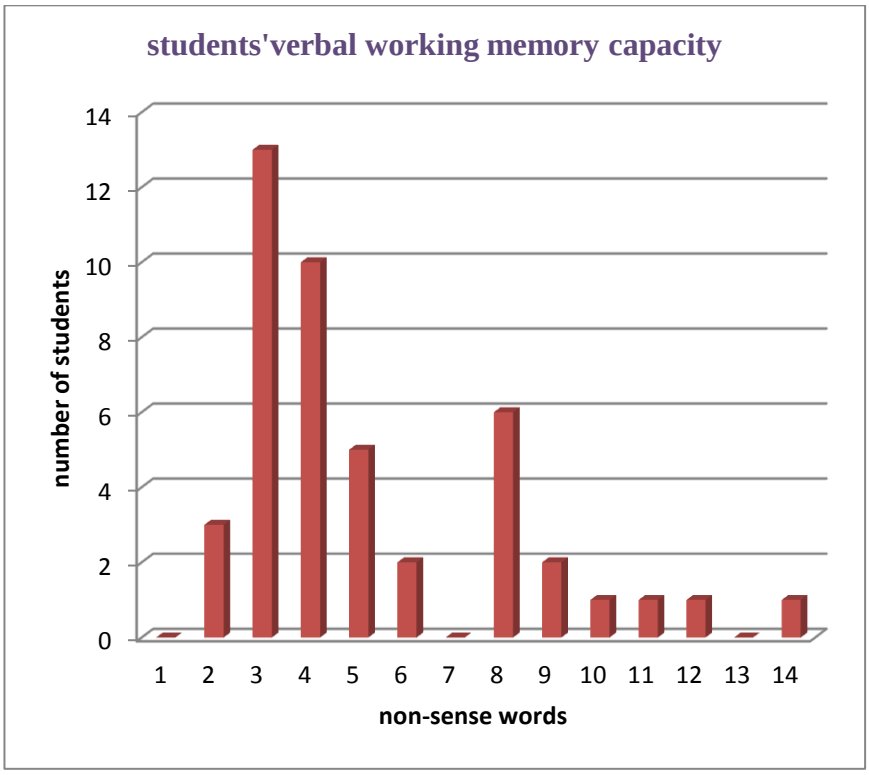


**Figure 4.1: Students' VWM Capacity**

The previous graph reflects the number of students who were able to remember only some words, and then stopped at a given level because they completely forget what the next word is. This graph reflects the students' verbal working memory capacity. It can also be notice that there is no correlation between the number of non-sense words

and the individuals' capacity as students remembering just three words were thirteen, for seven words no one, whereas eight words, there were six students.

**-Phase02**

In this second phase, the total number of students who were able to remember words at each level was counted, taking into consideration the fact that a student who remembered three words automatically is able to remember two and one words. This implies that this same student is counted three times at the three levels. This also means that the student who was able to remember the fourteen words is counted fourteen times reflecting the fourteen levels of the non-sense words. This would be well illustrated in the following table:

| Number of words | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of only students who remember | 0 | 3 | 13 | 10 | 5 | 2 | 0 | 6 | 2 | 1 | 1 | 1 | 0 | 1 | 45 |
| Number of students remembering | 45 | 45 | 42 | 29 | 19 | 14 | 12 | 12 | 06 | 04 | 03 | 02 | 01 | 01 | |

**Cf explanation of the table under graph N 2**

**Table 4.2: Students' Percentage of STM Capacity in the Pilot Study**

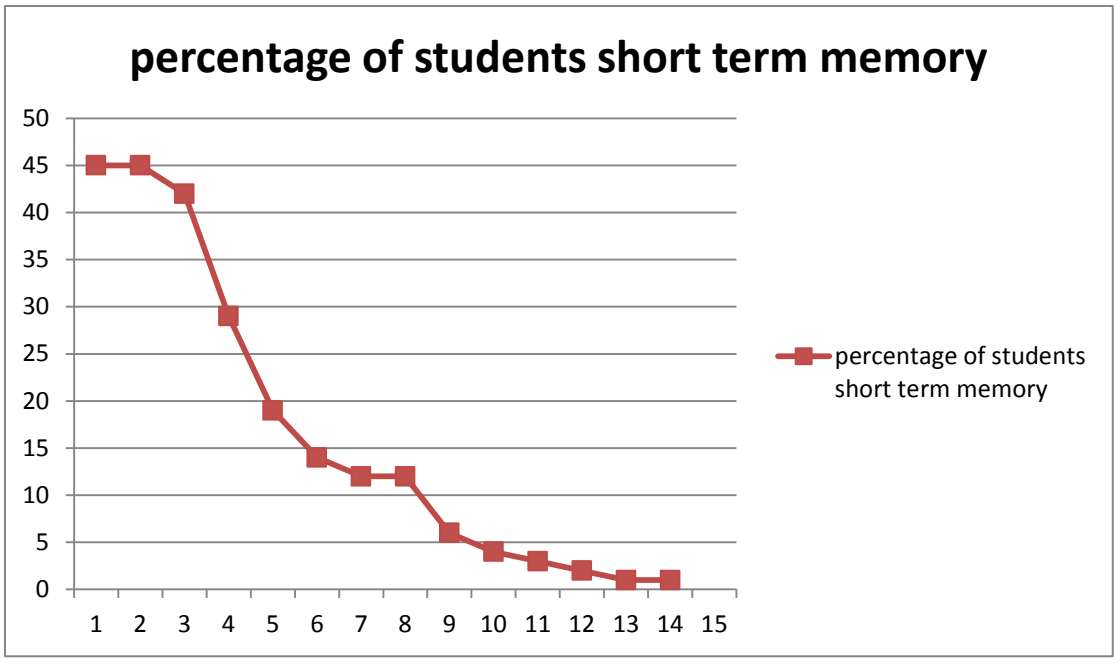


**Figure4.2: Students' STM Capacity in the Pilot Study**

In the second graph, it is noticed that there is a clear correlation between the number of words and the number of students while remembering: The longer the list is, the less the number of the students would be. i.e 100% of the respondents were able to remember at least two words; whereas 26.66% were able to remember seven words, and only 2.22% was able to remember the fourteen words.

During the experiment, it was noticed that the students while reading the list of the non-sense words were a bit confused. At the end of the experiment, when the students were gathered again in the classroom and asked about that apparent confusion, the majority of them answered that it was because of the words, which they qualified to be unusual, strange, and more interestingly "the words sound English, but they are not".

In fact, the student who reported the last remark (and she was the one who remembered the total number of words) was not wrong. To create those non-sense

words, real English words were chosen, one syllable of which was modified so that to get meaningless words that really sound English. Nevertheless, a minority of students were not aware during their repetition that those words were not English. It was observed that they uttered some non-sense words like 'klowledge, astronoby, redolution...'(knowledge, astronomy and revolution); whereas the rest of the words were assumed to be some English words the meaning of which is just ignored, and a simple search in a dictionary would reveal their meaning.

Another interesting remark made by the students who noticed the meaninglessness of the words was that they assured that making the link between the non-sense words and the real English words helped a lot in the retrieval process. Those students were given back their papers, corrected, and then asked to reveal the number of words they were able to recall. It was noticed that their answers varied from three to five words, which, in fact, could be considered as a poor short term memory capacity.

The reason behind this poor short term memory capacity can be deduced. The phonological loop in short term memory encodes information on the basis of their acoustic criteria. Besides, encoding words on the basis of their meaning is a common task performed by long term memory. Therefore, it can be concluded that the students' poor memory capacity is primarily due to the fact that they spent much time making a semantic association between the non-sense words and their equivalents in English, while at the same time, other words are being lost from the system because no rehearsal occurs. That is probably why they could not go beyond the fifth word.

Four students scored high in the test. They were again individually asked if the association between the non-sense words and the real English words helped them in the process of remembering, and who answered by "to a certain extent" asserted that to

remember those words, they rather repeated the words loudly and many times. Besides, they declared that the way the words were written and organized on the paper also contributed to the fulfilment of the remembering process. This may imply that to successfully remember those non-sense words, they relied, in addition to the verbal component of their short term memory (the phonological loop), on the visio-spatial sketchpad, which is another component of the working memory.

**Phase 03**

In the last phase of the experiment, the results of the test to the students' academic scores, were compared to check whether the test results correlate with the students' scores at school. What was found confirmed the hypothesis. In fact, the two students who scored very low in the test (they were able to remember only the two first words), were very low scorers at school, and they even repeated one academic year. However, the two students who scored high in the test (one student stopped at level twelve, whereas the other one, was able to remember the entire list), they are very excellent fourth year students with great academic scores. Furthermore, they speak English fluently with a satisfactory mastery of grammar and phonological rules.

For this, the verbal component of the individual's short term memory largely contributed to a successful foreign language learning especially to the development of the speaking skill in particular.

## 4.2.2- Coefficient of correlation

To scientifically check the extent to which we are correct in our experimental results, we gather all the obtained data in the experiment (see table 03), and then, correlate between variables as follows:

Formula for the product moment coefficient of correlation

$$R=\frac{N\sum XY-(\sum X)(\sum Y)}{\sqrt{[N\sum X2-(\sum X)2][N\sum Y2-(\sum Y)2]}}$$

## Data

-Subject number (N)…….....N=45

-Number of words remembered X……..... ∑X=235

-Number of words remembered squared $X^2$ .....∑$X^2$ =1393

-Academic Scores (speaking and phonetics) (Y).....∑Y=481

-Academic Scores (speaking and phonetics)squared ($Y^2$).....∑$Y^2$ =5446

-Cross Product (XY).....∑XY =2709

**1 − N ∑XY − (∑ X) (∑Y)**

45(2709)-[(235)(481)] =121905-107035

=14870

**2-** $\sqrt{[N\sum X2 - (\sum X)2][N\sum Y2 - (\sum Y)2]}$

$= \sqrt{[45(1393) - (235)2][45(5446) - (481)2]}$

$= \sqrt{[62685 - 5225][245070 - 231361]}$

$= \sqrt{(7460)(13709)}$

$=86.5 \times 117$

$=10120.5$

***3-*** $r = \frac{10120.05}{14870}$

r= 0.72

**4.2.3-Interpretation**

At 0.01 level of significance with 44 degrees of freedom, the required value of r (for two tailed test, i.e. in either direction) is 0.372. As the obtained value of r is 0.72, we can say that there is a very good correlation between the number of words remembered and the academic scores obtained by students in speaking and phonetics. All in all, our hypothesis has been confirmed, at least for the pilot study.

| Participants (N) | Number of words remembered (X) | (X) squared | Academic scores/speaking and phonetics (Y) | (Y) squared | Cross ( XY) product |
|---|---|---|---|---|---|
| 1 | 2 | 4 | 9.67 | 93 | 19 |
| 2 | 2 | 4 | 9.16 | 83 | 18 |
| 3 | 2 | 4 | 9.83 | 95 | 18 |
| 4 | 3 | 9 | 9.33 | 87 | 28 |
| 5 | 3 | 9 | 10.25 | 105 | 31 |
| 6 | 3 | 9 | 9.75 | 94 | 29 |
| 7 | 3 | 9 | 9.5 | 90 | 28 |
| 8 | 3 | 9 | 9 | 81 | 27 |
| 9 | 3 | 9 | 10 | 100 | 30 |
| 10 | 3 | 9 | 9 | 81 | 27 |
| 11 | 3 | 9 | 8.83 | 78 | 26 |
| 12 | 3 | 9 | 9 .75 | 94 | 28 |
| 13 | 3 | 9 | 9.92 | 98 | 29 |
| 14 | 3 | 9 | 9.58 | 90 | 28 |
| 15 | 3 | 9 | 9.75 | 94 | 28 |
| 16 | 3 | 9 | 9.67 | 93 | 28 |
| 17 | 4 | 16 | 10 | 100 | 40 |
| 18 | 4 | 16 | 10 | 100 | 40 |
| 19 | 4 | 16 | 10.16 | 103 | 41 |
| 20 | 4 | 16 | 10.08 | 101 | 40 |
| 21 | 4 | 16 | 10.25 | 105 | 41 |
| 22 | 4 | 16 | 10 | 100 | 40 |
| 23 | 4 | 16 | 10.83 | 117 | 43 |
| 24 | 4 | 16 | 10.92 | 118 | 43 |
| 25 | 4 | 16 | 10.67 | 114 | 42 |
| 26 | 4 | 16 | 11.17 | 124 | 45 |
| 27 | 5 | 25 | 10.17 | 103 | 51 |
| 28 | 5 | 25 | 10 | 100 | 50 |
| 29 | 5 | 25 | 11.83 | 140 | 57 |
| 30 | 5 | 25 | 10.83 | 117 | 43 |

| | | | | | |
|---|---|---|---|---|---|
| 31 | 5 | 25 | 9.67 | 93 | 47 |
| 32 | 6 | 36 | 10.84 | 117 | 65 |
| 33 | 6 | 36 | 10.67 | 114 | 63 |
| 34 | 8 | 64 | 12.08 | 146 | 96 |
| 35 | 8 | 64 | 13.33 | 177 | 106 |
| 36 | 8 | 64 | 14 | 196 | 112 |
| 37 | 8 | 64 | 9.75 | 94 | 75 |
| 38 | 8 | 64 | 12.08 | 146 | 97 |
| 39 | 8 | 64 | 12.83 | 164 | 102 |
| 40 | 9 | 81 | 14.58 | 212 | 125 |
| 41 | 9 | 81 | 13.17 | 173 | 115 |
| 42 | 10 | 100 | 13.33 | 177 | 133 |
| 43 | 11 | 121 | 14.50 | 210 | 160 |
| 44 | 12 | 144 | 15.08 | 231 | 180 |
| 45 | 14 | 196 | 14.08 | 198 | 196 |
| **∑ s =45** | **∑ x =235** | **∑ x2 =1393** | **∑ y =480.90** | **∑ Y2= 5446** | **∑xy = 2709** |

**Table 4.3: Students Variables of the Pilot Study**

After having obtained positive results throughout the pilot study, we conducted again the same experiment using the same procedure but on a larger population in an attempt to achieve the objectives of the present investigation. Also, we implemented the same method to analyse the result data of that experiment.

## 4.3- Main Study

### 4.3.1- Method

#### a- Participants

131 students in the department of English in the Teacher Training School of Constantine participated in that experiment. This time, the population includes fourth and third year students. Their age varies from 20 to 23 years old. The same interview is administered to them and it revealed that basically all of them belong to middle class families and that they have undergone the same Algerian educational parcours. As for their English language studies, most of them have declared that they began learning the language in "la première année moyenne".

In brief, the population consists of 131 students: 8 males and 123 females who are selected randomly for the aim of making sure that all students under investigation (high and low achievers) have equal chances for being selected.

#### b-Measurement

As it has been suggested in the pilot study, the tool used to assess the whole population working memory capacity is the non-word repetition test, a widely used test in psychology that is commonly applied to measure this type of the human memory system capacity. The administration of the test is done with a list of unfamiliar meaningless words, the size of which will vary from one to six or seven syllables. It is believed that this test is the unique activity which would objectively reflect the individual working memory capacity, as it has been shown through different similar studies in different academic contexts.

Taking into account the nature of the test, the focus is clearly directed to just remembering meaningless sounds that are put together. The activity of knowledge processing is therefore assured to be at the level of working memory, since no semantic association would be done to recall those sounds, which is a task commonly performed by long term memory. Using this test assures handling information by the verbal working memory component, the phonological loop.

In this case, the test is constituted of 14 words, the length of which varies from one to six syllables. Their arrangement in the list is random, i.e. The researcherdoesnot take into account any characteristic (characteristic of the sound, length ...) while writing them down on the list.

All in all, the whole population was invited to read the 14 words for three minutes (the time allocated for the rehearsal process). After that, they were asked to repeat the same non-sense words in the same order provided on the paper. The number of the remembered words, according to the principles of the non-sense repetition test, is said to reflect the subject working memory capacity.

**c-Procedure**

As in the pilot study, the whole population (131 students) are received in a traditional learning classroom during the course session of psychology they used to have with me, but, they are not told that they will have a test. The researcher again used a camera to videotape every little detail about the outcomes of the test like the students reactions towards the test, their way of rehearsing, their production and obviously the possibility of providing a comment or a remark about the whole process.

The first thing done before starting the test is gathering all the students to explain to them what they are supposed to do. Instructions like reading the words carefully during three minutes, writing down their names and ages on the sheet of paper are just examples of this brief talk that lasted approximately for 10 minutes. Before leaving the classroom, the students are informed that they will be received in pairs.

The whole experiment lasted for eight hours which has been organized within two days. As for the assessment of the students' working memory capacity, it is done on the same paper they read. In fact, they are given the floor to recite the non-sense word in the same provided order, when the subject notices that he/she is no longer able to retrieve any further word, he/she is asked to stop repeating. Thus, the last correctly repeated word is underlined, reflecting the maximum of the student's ability to recall sounds.

**d-Analysis and Interpretation**

The same procedure was followed as when analysing data in the pilot study. i.e. the analysis of the results of the present experiment underwent three basic phases.

**Phase 01**

To organize the data, the number of students who can recall some words and then stop at a particular level was counted. The following table summarizes how many students remembered a given number of words. Then the obtained results were tabulated and then translated into a graph.

| Number of words | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of student remembering | 0 | 13 | 24 | 18 | 6 | 4 | 5 | 24 | 11 | 8 | 4 | 3 | 3 | 8 |

**Table 4.4: Students VWM Capacity in the Main Study**

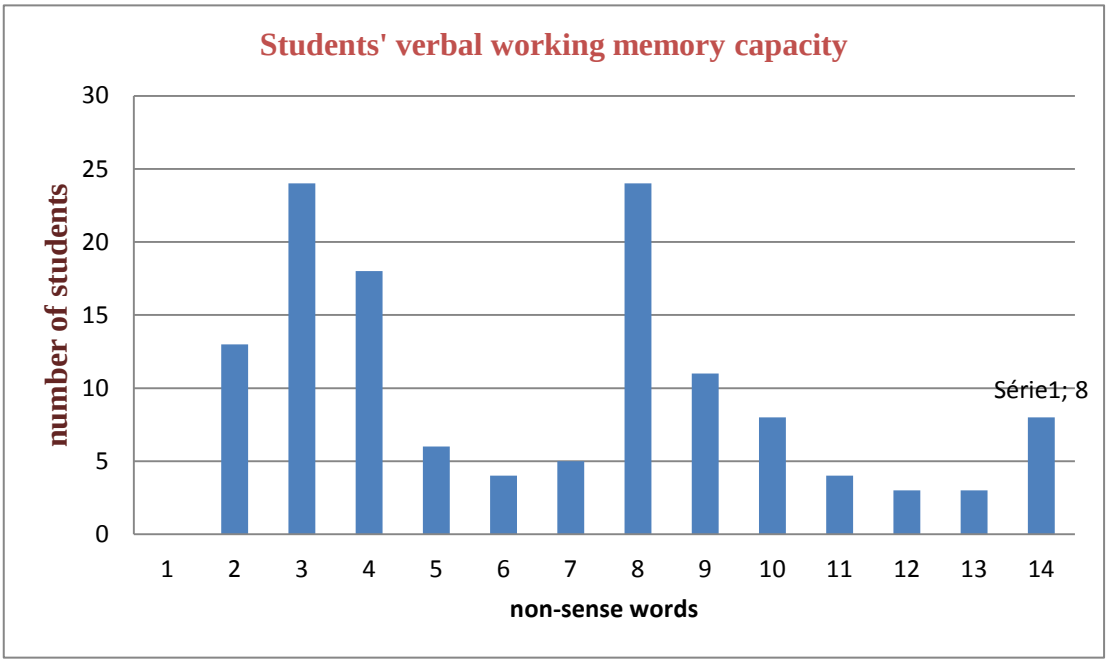


**Figure 4.3: Student VWM Capacity in the Main Study**

The same notifications observed in the pilot study are again revealed in the experiment. This graph reflects quantitative information related to the number of students who could remember some non-sense words in the provided list. In other words, this graph reflects the whole population real verbal working memory capacity. Obviously, one can easily notice that there is no correlation between the number of the non-sense words, and the number of students being able to remember given items. As an example, the whole population could remember at least two words; just five students could remember seven words whereas eight students remembered the whole list.

**Phase 02**

Again, throughout the second phase, the total number of the students who are able to remember words at each level was counted. This implies that an individual who can remember three items is obviously able to remember the one and two preceding items, meaning that this same individual is counted three times. Therefore, somebody who can remember the whole list (the fourteen words), he/she is counted fourteen times reflecting the total number of the words. The following table provides the appropriate and exact statistics about the results of the experiment.

| Number of words | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of students remembering only: | 0 | 13 | 24 | 18 | 6 | 4 | 5 | 24 | 11 | 8 | 4 | 3 | 3 | 8 |
| Number of students remembering: | 131 | 131 | 118 | 94 | 76 | 70 | 66 | 61 | 37 | 26 | 18 | 14 | 11 | 8 |

**Table 4.5: Students' Percentage VWM Capacity in the Main study**

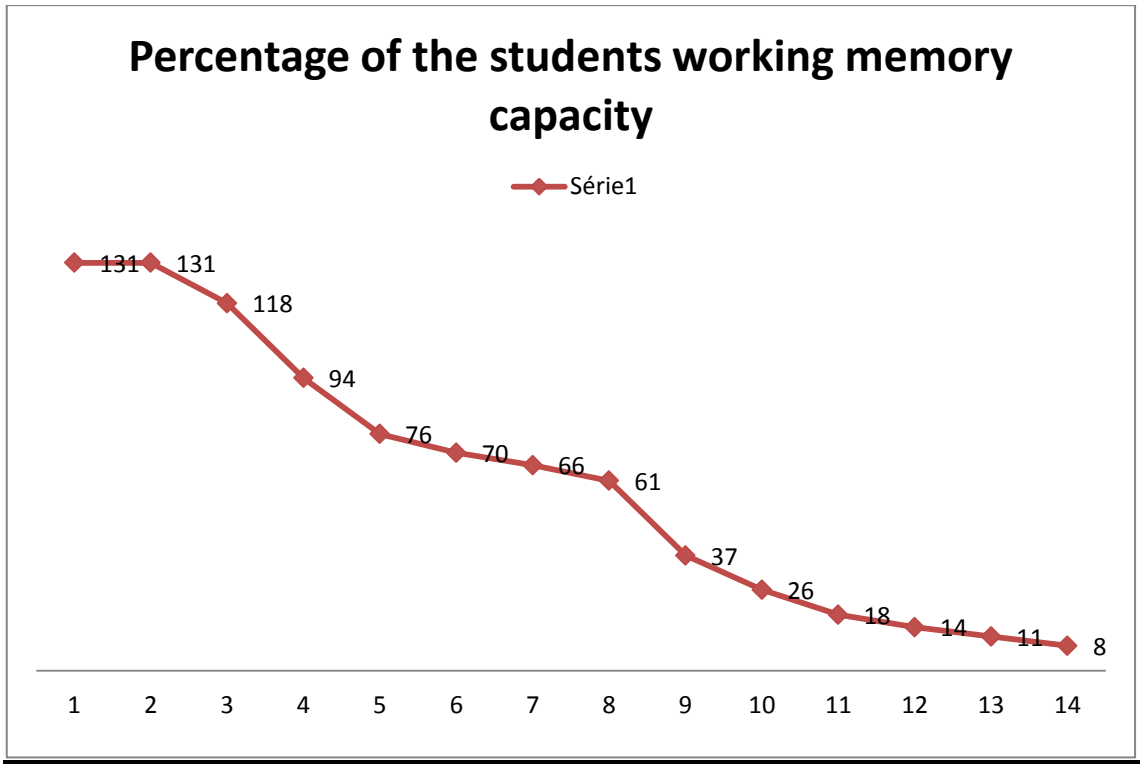


**Figure 4.4: Students Percentage STM Capacity in the Main Study**

The second graph of the general experiment is basically identical to the one of the pilot study. In fact, the correlation between the number of words and the percentage of the students while remembering is quite apparent: the longer the list is, the less the number of the students would be. As an example, 100 % of the population was able to remember at least two words; half of it (50.38 %) can remember half of the number of the words; and just 8 (6.10 %) reach the fourteen words.

Along with the experiment, the students showed different reactions. First of all they were so excited to know about their working memory capacity, especially that the test scheduling coincide with their own course of psychology about the different types of the memory system and their functions, and precisely, the role working memory capacity has on fostering their English language acquisition. Thus, they were aware of the whole procedure; they asked plenty of questions about the task, the nature of the

words, the allocated time to remember, and obviously before leaving, everyone asked for his/her working memory capacity. In addition to that, the majority of the students noticed the resemblance between the meaningless items and some English words. They even admitted that this similarity help them remembering the words of the list.

An interesting comment of one student reveals that if there is no semantic link between the non-sense words and their equivalents in English, the whole retrieval process will be impossible, and in case it happens, no one will go beyond the third or fourth word of the list. This remark encouraged the researcher to ask another question to the same student to know why he is so cynical about the results, especially that nothing in the experiment proves what he said. The answer is so convincing, since most of the students reply at the same time that if there is no similarity between the words provided

in the list and some other English words, the non-sense words will be just sounds, and remembering sounds which carry no meaning would be quite difficult. Theoretically speaking, the students are not wrong to say that, because, to rehearse, the students will first read the whole list, and then they are going to concentrate on the first items, since the instructions stipulate that they have to recite the words in the same order provided on the list. This means that while processing knowledge about the three or four first items, the thing which normally takes time, the remaining words of the list will completely be lost from the system knowing that knowledge processing at the level of short term memory, and thus keeping acoustic information in this particular part of the memory system cannot last for a long period of time.

This can be explained through the fact that, while rehearsing the whole list, the students may have felt the fourteen words competing among themselves in their heads to be produced, and with the instruction to recite them in the same order provided in the

list, the students, in addition to remembering the words, there must be a kind of knowledge organization, which takes time. Thus while retrieving the two or three first items, the other ones will completely disappear from the system. This is the reason which is believed to be behind the inability to remember many words.

The above statement leads the researcher to deduce another crucial observation related to Algerian English language learners. Students in our universities, and they are all adults as their age indicates, while learning a foreign language, they make use of their semantic long term memory rather than their working memory. A brief interview with the participating population about their way of learning vocabulary reveals that most of them use small notebooks in which they write down the new vocabulary, which they revise each time they are free. This implies that vocabulary is learnt in the same way as any other kind of knowledge in a given module. Whereas retrieving words quickly happens just with familiar and easy words which they are frequently accustomed to use. This explains the average and sometimes the bad scores of the students in modules related to speech production. In fact the excessive reliance on long term memory to learn vocabulary and therefore to improve the whole language acquisition process means that most of the subjects have poor working memory capacities, which is basically due to infrequency of practice at that level of the human memory system. This fact is assumed to be attributable to the nature of the English language itself. As a foreign language in the Algerian context, English is not widely used by the people everywhere like French. Besides, culturally speaking, most of its components and the way it is used within different settings are ignored by most subjects. Moreover, exposition to real native speakers from which onecan learn the appropriate pronunciation of the language as a whole is not so frequent. All these contribute, through a way or another to limiting the use of the English language speech,

a common activity performed by the working memory, and instead, the only way dealt with is through writing or reading, a common task that is performed by long term memory in general.

As in the pilot study, and after having obtained positive results that confirmed the statedhypothesis, all the obtained data in the experiment was again gathered (see Table 06), and then, correlation between variables occurred as follows to check the reliability of the obtained results.

### 4.3.2-Coefficient of Correlation

Formula for the product moment coefficient of correlation

$$R=\frac{N\sum XY-(\sum X)(\sum Y)}{\sqrt{[N\sum X2-(\sum X)2][N\sum Y2-(\sum Y)2]}}$$

## Data

-Subject number (N)…….....N=131

-Number of words remembered X…….....∑X=861

-Number of words remembered squared $X^2$ .....∑$X^2$ =7313

-Academic Scores (speaking and phonetics) (Y).....∑Y=1555

-Academic Scores (speaking and phonetics)squared ($Y^2$.....∑$Y^2$=19179

-Cross Product (XY).....∑XY=10848

**1-** $N\sum XY - (\sum X)(\sum Y)$

$=131(10848)\text{-}[(861)(1555)$

$=1421088\text{ -}1338855$

$=82233$

**2-**$\sqrt{[N\sum X2 - (\sum X)2][N\sum Y2 - (\sum Y)2]}$

$$= \sqrt{[131(7313) - (861)2][131(19179) - (1555)2}$$

$$=\sqrt{(958003 - 741321)(2512449 - 2418025)}$$

$$=\sqrt{(216682)(94424)}$$

$$= (465.5)\text{-}(307.3)$$

$$=143048.15$$

**3-** $r = \frac{82233}{143048.15}$

$$\mathbf{r = 0.57.}$$

**4.3.3-Interpretation**

At 0.01 level of significance with 44 degrees of freedom, the required value of r (for two tailed test, i.e. in either direction) is 0.372. As the obtained value of r is 0.57, we can say that there is a very good correlation between the number of words remembered and the academic scores obtained by students in speaking and phonetics. All in all, our hypothesis has been confirmed.In What follows, the table reflecting information about the 131 students in the main study:

| Participants (N) | Number of words remembered (X) | (X) squared | Academic scores/speaking and phonetics (Y) | (Y) squared | Cross (XY) product |
|---|---|---|---|---|---|
| 1 | 2 | 4 | 9,67 | 93 | 19 |
| 2 | 2 | 4 | 9,16 | 83 | 18 |
| 3 | 2 | 4 | 6,83 | 47 | 13 |
| 4 | 2 | 4 | 12,33 | 152 | 25 |
| 5 | 2 | 4 | 9,66 | 93 | 19 |
| 6 | 2 | 4 | 10,.5 | 110 | 21 |
| 7 | 2 | 4 | 12 | 144 | 24 |
| 8 | 2 | 4 | 10,33 | 107 | 20 |
| 9 | 2 | 4 | 13,5 | 182 | 27 |
| 10 | 2 | 4 | 12,66 | 160 | 25 |
| 11 | 2 | 4 | 9 | 81 | 18 |
| 12 | 2 | 4 | 12 | 144 | 24 |
| 13 | 2 | 4 | 9 | 81 | 18 |
| 14 | 3 | 9 | 9,33 | 87 | 28 |
| 15 | 3 | 9 | 10,25 | 105 | 31 |
| 16 | 3 | 9 | 9,75 | 95 | 29 |
| 17 | 3 | 9 | 9,5 | 90 | 28 |
| 18 | 3 | 9 | 9 | 81 | 27 |
| 19 | 3 | 9 | 10 | 100 | 30 |
| 20 | 3 | 9 | 9 | 81 | 27 |
| 21 | 3 | 9 | 8,83 | 77 | 26 |
| 22 | 3 | 9 | 9,75 | 95 | 29 |
| 23 | 3 | 9 | 9,92 | 98 | 30 |
| 24 | 3 | 9 | 9,58 | 94 | 29 |
| 25 | 3 | 9 | 9,75 | 95 | 29 |

| | | | | | |
|---|---|---|---|---|---|
| 26 | 3 | 9 | 9,67 | 93 | 29 |
| 27 | 3 | 9 | 10,33 | 107 | 31 |
| 28 | 3 | 9 | 10,83 | 117 | 32 |
| 29 | 3 | 9 | 10,33 | 107 | 31 |
| 30 | 3 | 9 | 9,5 | 90 | 29 |
| 31 | 3 | 9 | 14,5 | 210 | 43 |
| 32 | 3 | 9 | 13,33 | 177 | 40 |
| 33 | 3 | 9 | 13,33 | 177 | 40 |
| 34 | 3 | 9 | 13 | 169 | 39 |
| 35 | 3 | 9 | 11,83 | 140 | 35 |
| 36 | 3 | 9 | 13,66 | 186 | 41 |
| 37 | 3 | 9 | 13,75 | 189 | 41 |
| 38 | 4 | 16 | 10 | 100 | 40 |
| 39 | 4 | 16 | 10 | 100 | 40 |
| 40 | 4 | 16 | 10,16 | 103 | 40 |
| 41 | 4 | 16 | 10,08 | 101 | 40 |
| 42 | 4 | 16 | 10,25 | 105 | 41 |
| 43 | 4 | 16 | 10 | 100 | 40 |
| 44 | 4 | 16 | 10,83 | 117 | 43 |
| 45 | 4 | 16 | 10,92 | 119 | 44 |
| 46 | 4 | 16 | 10,67 | 114 | 43 |
| 47 | 4 | 16 | 11,17 | 124 | 44 |
| 48 | 4 | 16 | 10 | 100 | 40 |
| 49 | 4 | 16 | 9 | 81 | 36 |
| 50 | 4 | 16 | 13,91 | 194 | 56 |
| 51 | 4 | 16 | 11 | 121 | 44 |
| 52 | 4 | 16 | 12,66 | 160 | 50 |

| | | | | | |
|---|---|---|---|---|---|
| 53 | 4 | 16 | 14,83 | 220 | 59 |
| 54 | 4 | 16 | 10 | 100 | 40 |
| 55 | 4 | 16 | 12,66 | 160 | 50 |
| 56 | 5 | 25 | 10,17 | 103 | 51 |
| 57 | 5 | 25 | 10 | 100 | 50 |
| 58 | 5 | 25 | 11,83 | 140 | 59 |
| 59 | 5 | 25 | 10,83 | 117 | 59 |
| 60 | 5 | 25 | 9,67 | 93 | 48 |
| 61 | 5 | 25 | 10 | 100 | 50 |
| 62 | 6 | 36 | 10,84 | 117 | 65 |
| 63 | 6 | 36 | 10,67 | 114 | 64 |
| 64 | 6 | 36 | 10 | 100 | 60 |
| 65 | 6 | 36 | 13,13 | 172 | 79 |
| 66 | 7 | 49 | 10,33 | 107 | 72 |
| 67 | 7 | 49 | 12,59 | 159 | 88 |
| 68 | 7 | 49 | 14,17 | 200 | 99 |
| 69 | 7 | 49 | 11,83 | 140 | 83 |
| 70 | 7 | 49 | 12,5 | 156 | 87 |
| 71 | 8 | 64 | 12,08 | 146 | 97 |
| 72 | 8 | 64 | 13,33 | 177 | 107 |
| 73 | 8 | 64 | 14 | 196 | 112 |
| 74 | 8 | 64 | 9,75 | 95 | 78 |
| 75 | 8 | 64 | 12,08 | 146 | 97 |
| 76 | 8 | 64 | 12,83 | 164 | 103 |
| 77 | 8 | 64 | 12,5 | 156 | 100 |
| 78 | 8 | 64 | 13,13 | 172 | 105 |
| 79 | 8 | 64 | 13 | 169 | 104 |

| | | | | | |
|---|---|---|---|---|---|
| 80 | 8 | 64 | 13,5 | 182 | 108 |
| 81 | 8 | 64 | 12,5 | 156 | 100 |
| 82 | 8 | 64 | 13 | 169 | 104 |
| 83 | 8 | 64 | 14 | 196 | 112 |
| 84 | 8 | 64 | 12,5 | 156 | 100 |
| 85 | 8 | 64 | 10 | 100 | 80 |
| 86 | 8 | 64 | 11,33 | 128 | 91 |
| 87 | 8 | 64 | 11,83 | 128 | 95 |
| 88 | 8 | 64 | 12,11 | 147 | 97 |
| 89 | 8 | 64 | 14,33 | 205 | 114 |
| 90 | 8 | 64 | 14,66 | 215 | 117 |
| 91 | 8 | 64 | 12 | 144 | 96 |
| 92 | 8 | 64 | 12,5 | 156 | 100 |
| 93 | 8 | 64 | 10,33 | 107 | 83 |
| 94 | 8 | 64 | 12,91 | 166 | 103 |
| 95 | 9 | 81 | 14,58 | 213 | 131 |
| 96 | 9 | 81 | 13,17 | 173 | 118 |
| 97 | 9 | 81 | 10,33 | 107 | 93 |
| 98 | 9 | 81 | 14,56 | 212 | 131 |
| 99 | 9 | 81 | 12,5 | 156 | 112 |
| 100 | 9 | 81 | 14,66 | 215 | 132 |
| 101 | 9 | 81 | 13,5 | 182 | 121 |
| 102 | 9 | 81 | 10,08 | 102 | 91 |
| 103 | 9 | 81 | 13,66 | 186 | 123 |
| 104 | 9 | 81 | 13,33 | 177 | 120 |
| 405 | 9 | 81 | 10 | 100 | 90 |
| 106 | 10 | 100 | 13,33 | 177 | 133 |

| | | | | | |
|---|---|---|---|---|---|
| 107 | 10 | 100 | 12,5 | 156 | 125 |
| 108 | 10 | 100 | 14,5 | 210 | 145 |
| 109 | 10 | 100 | 15,25 | 232 | 152 |
| 110 | 10 | 100 | 13,16 | 173 | 132 |
| 111 | 10 | 100 | 12,16 | 148 | 122 |
| 112 | 10 | 100 | 15,66 | 245 | 156 |
| 113 | 10 | 100 | 15,83 | 250 | 158 |
| 114 | 11 | 121 | 14,5 | 210 | 159 |
| 115 | 11 | 121 | 16,15 | 261 | 181 |
| 116 | 11 | 121 | 13,41 | 180 | 147 |
| 117 | 11 | 121 | 12,5 | 156 | 137 |
| 118 | 12 | 144 | 15,08 | 227 | 181 |
| 119 | 12 | 144 | 15 | 225 | 180 |
| 120 | 12 | 144 | 15 | 225 | 180 |
| 121 | 13 | 169 | 15,08 | 227 | 196 |
| 122 | 13 | 169 | 12,33 | 152 | 160 |
| 123 | 13 | 169 | 14 | 196 | 182 |
| 124 | 14 | 196 | 14,08 | 198 | 197 |
| 125 | 14 | 196 | 14,5 | 210 | 203 |
| 126 | 14 | 196 | 13,83 | 191 | 193 |
| 127 | 14 | 196 | 13,25 | 175 | 185 |
| 128 | 14 | 196 | 12,91 | 167 | 181 |
| 129 | 14 | 196 | 13,25 | 175 | 185 |
| 130 | 14 | 196 | 12 | 144 | 168 |
| 131 | 14 | 196 | 14 | 196 | 196 |
| **∑n = 131** | **∑x =861** | **∑ x2 =7313** | **∑y =1555,39** | **∑Y2=19179** | **∑xy =10848** |

**Table 4.6: Students' Variables in the Main Study**

## Conclusion

To conclude, working memory is an essential element in developing learners' oral proficiencies, obviously, through making a frequent use of it. This could be achieved through providing opportunities to learners to use the language orally and exposing them to authentic materials, the objective of which is to concentrate on speech. For, it is the only way to assure that the knowledge being processed in the memory system occurs acoustically at the level of working memory. By doing so, the student would develop a kind of habit of making frequent use of the aural skills, a common activity fulfilled by the working memory, at the expense of handling knowledge in accordance to meaning, which is basically a long term memory task. This is believed to be one effective way to develop learners' speaking skill, since it is assumedthat much speech means more use of the verbal component of the short term memory,the phonological loop, and more practice means more rehearsal. This implies that the phonological loop is a sub-component of working memory which is responsible for retaining information verbally over short periods of time, and in its turn, it is composed of a phonological store, where phonological information is to be kept, and a rehearsal process, which serves to keep decaying verbal information in the phonological store.

# ChapterV:

# Questionnaire Analysis

## Chapter V: Questionnaire Analysis and Interpretation

## Introduction

The second part of the empirical research is set to support the findings and results of our experimentation, which asserted the fact that working memory capacity is very crucial in developing learner's oral proficiency. Thus, a questionnaire is submitted to 3rd and 4th year students in the department of English in the Teacher Training School of Constantine. According to Richards and Schmidt (2002:438); "questionnaires are doubtless one of the primary sources of obtaining data in any research endeavour". Therefore, to seek evidence for the theoretical assumptions and hypotheses in the review of literature, the following section is devoted to an analysis of statistical and quantitative data collected out of learners' questionnaire answers.

The questionnaire targets, in addition to highlighting the relevance of working memory capacity in developing EFL learners oral proficiencies (which has been positively proved in the previous experimentation),other sub-questions like:

- Is there any relationship between working and long term memory systems while processing knowledge?
- Can working memory rely on long term memory characteristics for a better speech production?
- Is students' inability to fluently produce speech is due to forgetting particular kinds of knowledge? And in case the answer is yes, what is (are) the main reason (s) behind forgetting?

### 5.1-Aim of the Questionnaire

The students' questionnaire aims at gathering data that help understand the extent to which working memory capacity contribution can be crucial in developing learners' oral proficiency. Besides, it intends to collect both facts and opinions related to learners' own evaluation of their speaking skill during the three or four years of study in the school. It also aims at finding out whether or not learners are aware of the role memory plays in improving their oral proficiency; i.e, do learners attribute speech proficiency improvement to their memory system or to other facts.

### 5.2-Description of the Questionnaire

The questionnaire consists of nineteen (19) questions distributed through three major axis:

**-General information,** three questions with which we begin the questionnaire covering issues related to age, sex and period learners spent in the school.

**-Language/speaking improvements,** we concentrated on language characteristics (question 1 to 12). Along these items, we questioned the improvement of the learners' English language as a whole, speaking as related to other skills, the psychological status of the learners while speaking, and finally media and techniques used by the instructor to teach new vocabulary.

-While arousing the issue of the techniques used either by the teacher or the learner, we introduced the notion of **memory** in item 13, and continued covering different other aspects of the notion until item 18.

-Item 19; however, aims at sorting out the general idea English language learners have about their oral proficiency improvement and its eventual connection to memory in general and working memory in particular.

### 5.3-Description of the Population under Investigation

The choice of an appropriate population to administer the intended questionnaire constitutes a big challenge to reach the target objective. The crucial question was about which category of students in the department of English in the Teacher Training School of Constantine would fit the targeted objectives of the questionnaire items. Taking into account the nature of the questionnaire content, we proceed through elimination. As already mentioned, the questionnaire aims at highlighting the relevance of working memory, among many other factors, in developing the learners' oral proficiency. This implies that the researcher is in need of learners that have studied at least two years in the school to be able to develop some criteria of the English language aspects and then decide about the language improvement. On the basis of that, it seems obvious that 3rd, 4th and 5th year students are likely to be the most appropriate population to be able to respond to the questionnaire items. Yet, and because of the circumstances and conditions of 5th year palier (generally characterised by massive studies, preparation of a dissertation and drafting a training report, in addition to their frequent absence along the year because of some other pedagogical tasks, the training in particular) we are unable to accede , and therefore administer the questionnaire to 5th year students.

The remaining population (3rd and 4th year), and regarding their characteristics, were quite satisfying as a sample to whom the questionnaire was administered, and who really showed criteria that serve the objectives of that second part of the empirical investigation.

Amongst those criteria that push the researcher to choose the already mentioned population, one can list:

-Studying in the school for at least two or three years, a period which is judged to be quite reasonable to allow them develop the different grammatical and phonological rules governing the English language.

-Both 3rd and 4th year students had attended the course of psychology throughout which they have been introduced to the concept of the memory system with all its parts and functions in details.

-Finally, after two or three years of study of different materials in the school, we believe that such kind of students are aware of the changes that occur to their English language, and thus will be able to discern and attribute this improvement to factors they themselves judge to be most appropriate.

The total number of the population is therefore 134 students, most of which are females (128). Their ages vary from 20 to 24years old. Among the same population, 70 students (52.23%) have studied for three year in the Teacher Training School of Constantine, 37 students ( 27.61%) for Four years whereas six students (4.74%), probably repetitives, for five years.

This diversity in terms of age and number of years of study in the school will allow a diversity of opinions and point of views that would inevitably enrich our questionnaire analysis. As for gender, it is noticed that that there is a very high percentage of females (95.59%) while only 4.74% of boys, a common characteristic for all English learners at all levels in the school. Yet, since the objectives of the

questionnaire are not related to gender effect in developing learners' oral proficiency, we judge the situation to have no negative impact on our research findings and analysis.

### 5.4-Administering the Questionnaire

The questionnaire is anonymous. The researcher, being a teacher of English in the school,largely facilitated to summon the respondents and ask them to fill in the questionnaire. Thus, being the one responsible for administering the questionnaire proved to be very advantageous in the sense that, first, she could help learners understand the objectives and the meaning of each item. Second, observing the respondents dealing with the questionnaire helpedin noticing the extent to which learners are both involved and motivated to answer the questionnaire items.

### 5.5- Analysing the Questionnaire

**Item 01**

-Along your course of study of English as a foreign language, do you think your English has improved?

-Yes -No

**Item 02**

-Whatever may be the answer, could you say why?

Item 01 and 02 are meant to highlight the extent to which learners in the department of English in the Teacher Training School of Constantine are aware of their language improvement (in all domains not only speech) along their course of study of English as a foreign language, and if it is the case, to which factor do they attribute this improvement.

The great majority of the population under investigation (133) answered "yes". i.e, 99.25% of the target population agree on the point that there is a considerable

development in their English during the time they spent in the ENS. As for the reasons behind this, they are so numerous. A good illustration, as put by one of the learners, is practice in oral expression, writing and phonetics sessions.

Another learner specifies that the basic reason behind such an improvement is due to a very active interaction in the classroom, whereas a great deal of students share the idea that intensive reading also greatly contribute to develop their English in all the aspects of the language. Yet, the most striking answer is the following:

> "My English has improved thanks the great efforts of both me and the teacher. I begin by listening a lot to some videos and to my teacher too without talking. When I developed my vocabulary, with many lexical items and authentic expressions, the task was pretty possible."

The learner's explanation reflects the student's need to fill his/her linguistic repertoire with sufficient vocabulary to be able to produce the language and understanding it too. Another equally important reply is the one in which the respondent reports that her English has improved "…simply because now my writing quality has changed……The reasons behind that is having acquired new vocabulary through massive reading". The latter student while talking about her English improvement, explainsit through one aspect of the language different skills, which is the graphic one (writing and reading), whereas the former student, to highlight the same issue, she gives much importance to the aural one (listening and speaking). Both replies are meant to illustrate how their English positively improved but through two different ways reflecting at the same time the learners' opinion about which aspect of the language has improved. Bearing in mind that, while formulating this question, we do not emphasize on no specific skill of the language. (The question is asked in a general way: did your English improve?)

In fact, we are greatly satisfied with the results of the two first items' analysis because they confirm that our order of the items of the questionnaire and the way these questions are formulated is not random. We notice that the questionnaire items are logically interrelated. Item 03, as it may be seen later in the next is meant to understand the learners' conception about which skill really reflects their mastery of the English language. There is a great correlation between the answers of item 02and 03 in the sense that those who attribute their English improvement to listening and speaking believe that the skill that reflects their mastery of the language is speaking. Those who believe that the same issue is owed to writing and reading answer that their mastery of the language is reflected through one of the graphic skill (writing).

On the other hand, just one respondent constituting 0.75% of the whole population answers neither "yes" nor "no". She adds a third option which is "to some extent". To justify her answer, she writes: "I am a bit fluent than I used to be when I came first to the ENS, because I still can use the little vocabulary I learnt during the four years of my presence here"

At first glance, it seems that this answer does not serve the objectives of the present item. Yet, a deep consideration of what she suggests, the feeling of anxiety is completely reduced. In fact, this first section of the questionnaire, as already mentioned, is meant to tackle issues related to linguistic aspects and then we smoothly passed to the role of memory in the second section. This student, however, with this particular answer, directly jumped to our targeted conclusion. Since, assuring that she can still use the little vocabulary she has learnt during the previous years, implies that if this old vocabulary is still usable, it is because it has been kept somewhere in the memory system, the notion that constitutes the basic framework of the present research paper.

**Item 03**

-In your opinion, which of the four skills you think reflects best your mastery of the English language?

a-Writing
b-Speaking
c-Reading
d-Listening

Item 03 objective is a kind of opinion poll in order to know the conception the students have about mastering English. i.e, it is an attempt to reflect how learners think mastering a foreign language is. The following table summarizes the students' answers:

| Speaking | Writing | Reading | Listening |
|---|---|---|---|
| 56 | 46 | 26 | 06 |

**Table 5.1: Students Opinions about the Four Skills**

According to the table the majority of the students (56) think that the skill that really reflects their mastery of the English language is their fluency (speaking). In second position, written production is thought of to be a very important skill that shows that learners do master English. Reading or to a certain extent, understanding what is being read is the skill that, still according to the same population (56), mirrors their English linguistic ability. In the last position comes listening or understanding what is being said is believed by six learners to be the best way to exhibit that same linguistic ability.

The sum of all that is that the Algerian students, and it is a widespread phenomenon, believe that oral proficiency, fluency or speaking is a very important aspect that reflects the extent to which a foreign language learner masters the target language. In other words, being fluent means to be a good learner.

**Item 04**

-How do you find the Speaking skill compared to the other skills:

-Easy
-Average
-Difficult

Our intention behind formulating such a question is to expose the degree of difficulty or easiness of the learners' aural skill acquisition in an attempt to explain how some learners frequently interact in the target language. The results are as follows:

| | |
|---|---|
| Easy | 32 |
| Average | 89 |
| Difficult | 13 |

**Table 5.2: Students Opinion about the Speaking Skill**

The great majority of the English learners (89) believe that speaking is not a difficult task, but at the same time it is not that easy (average). 32 learners, however, assume that it is easy to fluently speak English whereas 14 learners said that speaking is, in fact, a very difficult task.

**Item 05**

Do you feel frustrated or unable to orally produce the language in the classroom during the speaking skill session?

-Yes

-No

This question somehow complements the preceding one since it aims at highlighting the reasons behind the raised issue. Throughout this question, we want to draw the line

under an eventual possibility that not being able to speak could be due to some psychological factors. The results are very interesting and we still classified them in relationship to item 04.

- Those who answered in item 04 that speaking is difficult are14 out of which 13 students felt frustrated and one students did not.
- Those who answered in item 04 that speaking is average are 89 out of which41 felt frustrated and the remaining ones ((48) did not.
- Those who answered in item 04 that speaking is easy are 32 out of which just five students felt frustrated whereas the 27 remaining ones did not.

It is noticed that the obtained answers in item 05 greatly correlate with those of item 04. In fact, The expectancy was that those who find that speaking is an easy task normally do not have any psychological obstacle to orally express themselves. Those who believe that speaking is an average task in terms of its acquisition; however, we expected both possibilities (yes/no). Finally, among the 14 learners who believe that speaking is a very difficult task to be achieved; only one of them assured that she has no psychological problem that prevents her from expressing herself in English.

**Item 06**

-In either case, say why?

To interpret and give a meaning to the obtained results in both item 04 and 05, we proposed item 06 so that learners can freely explain why or why not learners feel or do not feel frustrated while speaking.

**Category 01**: students who believe speaking is difficult and feel frustrated while speaking (13 out of 14)

Most of these learners; while explaining why they do not feel at ease while speaking, attribute the subject in question to many psychological factors like being shy as put by one of the students: "….because sometimes I feel shy while facing other students, or because I am afraid of making mistakes". Another reason proposed by another student is being underestimated and inhibited by the teacher: "I feel unable to produce English in the classroom because the teacher does not pay attention to what I am saying". The same student also talked about two further causes behind her inability to speak in the classroom related to lack of confidence and self-esteem "….some of the classmates laugh and criticize their friends and the teacher encourages them . In addition to that, the student raises the issue of lack of motivation when she wrote "…..third, the subjects of the discussion are not interesting and boring".

A third student talked about fear "…I felt afraid of making stupid mistakes", whereas, a fourth student, even though she assures that she is all the time frustrated while speaking, she did not attribute this to any psychological reasons, but instead, she simply reported that " ….I like the written language rather than the spoken one. In oral expression session, I like listening to what others are saying".

This implies that in addition to the already mentioned psychological factors, the learners' likes and dislikes in what is being taught is very essential in motivating the learners' speaking skill acquisition. What is understood from what the student proposed is that she is good at one of the graphic skill (writing) at the expense of the aural one (speaking).

Coming back to the point of the relevance of the psychological factors in hampering the learner's oral proficiency, the researcher has conducted a research study (magistère dissertation in 2005) entitled "Identification of Some Psychological Factors

Leading to Failure in Developing the Learner's Oral Proficiency", and throughout which, she could identify the same psychological factors raised by the learners amongst many others (introversion, extroversion, field independency, field dependency, empathy, apathy, aversion, inhibition, motivation and anxiety). Along the analysis of a more detailed questionnaire about the topic, the researcher finally came to the conclusion that all these psychological factors could be very hampering to speaking skill development if they are not taken seriously by the teachers and instructors. The investigation was conducted in the same Algerian context, but in a different university (English Department in Batna University).

**Category 02:** Students who believe that speaking is difficult but do not feel frustrated while speaking (01 out of 14)

The student who provided this answer is a 22 year old girl. She explicitly declares that acquiring the speaking skill is a difficult task for her, but not to the extent that she feels frustrated when speaking. While explaining the reason behind that in item 06, she writes "I do not feel frustrated while speaking, when mastering the rules it becomes easy to speak, but I do not like to speak the English language or anything related to English since I had no other option to choose when I obtained my baccalaureate"

Again and despite the fact that the student finds it difficult to orally express herself, she does not attribute this to frustration, but rather to not being motivated to learn something she does not like.

The final conclusion to both categories' results is that even though there are some differences in the reasons behind not being able to speak English, the great

majority of the students directly or indirectly attribute that to their own psychological status. In other terms, the psyche of the learners has a great effect on learners' speech production. A good illustration of that is when learners are motivated and interested in the topic of discussion, have enough self-esteem, and are not afraid of their teachers or classmates reactions to their performances, they would participate in the classroom and orally practice the language without caring about the eventual mistakes they could commit.

**Category 03:** Students who believe that speaking skill acquisition is average and feel frustrated while speaking (41 out of 89)

Almost half of the students believe that being fluent is neither easy no difficult, yet, when it come to the act itself, they feel frustrated and afraid. While consulting item Six answers to understand and interpret the reasons, we found a diversity of opinions that all converge to meet on the same central points. For almost all the 41 learners, though they believe having a certain potential to speak, yet they are inhibited by some psychological factors like fear of the audience or of the teacher: being shy, fear of committing mistakes in front of their classmates, boring topics leading to demotivation etc…

**Category 04:** Students who believe that the speaking skill acquisition is average but do not feel frustrated while speaking (48 out of 89)

This category of students assume that even though speaking for them is neither difficult nor easy, they do not show any kind of frustration or fear while speaking. In item 06, they attribute this situation to the teacher's encouragement to speak without paying attention to errors. In this respect, one of the students wrote:

> "Since I am able to carry out a conversation, to express my thoughts and ideas, even if I commit mistakes, ……because no one is perfect. Why shouldn't I speak? I feel at ease because my teachers were encouraging us to speak and participate and give our opinions. If it is right, it is good for me, if it wrong, I will learn from my mistake"

Another issue raised by the concerned students related to the same question is the one of being adapted to the context in which they practice English (the classroom, the classmates and the teacher). One of the students wrote "I am shy by nature, but we have been studying with each other for three years, that is why, I am no longer afraid of my friend's opinions when I commit mistakes".

Other students, however, attribute that to motivation like in the case of a 23 year old girl "I do not have a problem in facing our audience even if my English is not good. I just say whatever comes to my mind……Although I commit mistakes; I carry on speaking especially if the topic is interesting"

**Category 05:** Students who believe that speaking is an easy task and not feel frustrated.

As it is expected, the great majority of the learners of this category judge themselves to be fluent and do not have any problem to express themselves. One of the students proposed what follows "….because I enjoy the language, so I enjoy sharing my ideas". Another one provided a very interesting comment "….during the speaking session, I feel released and at ease, so there is nothing that prevents me from speaking as well as committing mistakes and learn new vocabulary". All in all, the learners of this category share many positive psychological factors like self-confidence, motivation, a strong personality that contribute to speech development, the thing that comes to confirm that the psychological factors could be very influential in improving/hampering

learning a foreign language in general, and developing one's oral proficiency in particular.

**Category 06:** Students who believe that speaking is an easy task, but still feel frustrated while speaking (05 out of 32)

These five students while explaining why, even though they speak fluently, they are not at ease while expressing themselves in the classroom. They answer varies from one student to another. One of the students declares that she speaks the language very well, and that she has the appropriate ideas in the appropriate moment, yet, she does not see any advantage for sharing her ideas with others (symptoms of an introvert person). The remaining ones confirm that topics to be discussed or materials used during the oral expression session are not interesting, that is why, they do not participate.

At last, the sum of the analysis of each of Item 04,05 and 06 reveal that among the problems learners suffer from while speaking, three could be exclusively distinguished:

-The role of the teacher as well as the method, the techniques and strategies used while teaching the speaking skill.

-The learner's personality traits like being introvert or extrovert.

-Some psychological factors like motivation, fear, anxiety etc…

The issue that can be raised now is what has the learner's psychological status to do with the major concern of the present study?

In chapter 03, in the section while discussing implementing working memory techniques in the classroom, the researcher focused on showing the relevance of some psychological factors on the memorization process. In fact, it is stipulated that many of

the psychological factors, motivation in particular, has a direct impact on learners' attention. The latter process is said to be the key element to a good storage since no one can remember something to which no attention is paid to.

**Item 07**

In case your answer to item 5 is 'Yes', Do you attribute this to:

A-Lack of linguistic knowledge (lack of vocabulary)

b-The subject being taught is not interesting

c-Some psychological factors like shyness, introversion, inhibition..

d-Others, specify.....

Item 07 aims at confirming that one of the most fundamental factors that prevent learners from speaking fluently is their psychological status. Also, and indirectly speaking, it can be assumed by now that, being psychologically speaking unstable or not at ease, could be the beginning of a bad functioning of the individual's mental processes. This would lead to less concentration and attention, the thing which is believed to be very crucial and has a great impact on a normal functioning of the learners' different mental processes like intelligence, thinking and obviously memory. Thus it is believed that the psychological status of the learner, among many other different factors, can be the reason behind a bad memorization that leads next to a very slow acquisition of vocabulary items, and at the end there will be no speech at all. Being not able to speak or to appropriately express oneself, will inevitably lead to demotivation.

The structure of the question and its optional answers, as one may notice, are closely interrelated, yet, the targeted objective is just to see the order of importance of these factors as seen and considered by the learners' themselves. When asked to answer

item 07, the respondents were allowed to tick more than one choice. The final results were as put in the following table, bearing in mind that the learners who ticked "yes" for item 05 are the only respondents concerned with this question. (59 students)

| | |
|---|---|
| A | 14 |
| B | 13 |
| C | 35 |
| D | 05 |

**Table 5.3: Causes of Non-fluency**

The great majority of the 59 students ticked "c", that is related to some psychological factors. This means that about three quarters of the concerned population are aware that their psychological status is behind their hesitation when they speak, and this largely confirms our assumption. In second position, (14) learners ticked "a", related to lack of linguistic knowledge (basically lack of vocabulary items). This second category of learners shares the idea that this inability to fluently speak language is largely due to the fact that they do not have enough vocabulary items with which the transmission of their oral massages and ideas would be easy and possible.

Third, 12 students out of the 59 ones, attribute their inability to speak to the fact that the subject being taught is not interesting. In other words, the subject matter being discussed in not motivating.

Finally, out of 59 concerned students, six choose to propose other factors that are as put by them:

1-“This is natural in me, I do not appreciate talking”.

2-“I am not fluent””.

3-“Lack of outside exposure to the English language”.

4-“Fear of stage”

5-“Lack of preparation when it comes to oral presentation”.

It is noticed that proposition n 01and 04 are purely psychological, and that they could be added to many other factors of the same nature ( as showed through the answers of question n:6). In the first answer, for example, the student is aware that the psychological problem that prevents her from expressing herself is her own personality trait of being introvert. In the fourth one, however, the subject is afraid of facing the audience.

Proposition n:02, stipulates that the student is simply not fluent, reflecting at the same time that the learner superficially deals with her problem of being non-fluent since she proposed no other factor behind this luck of fluency.

Proposition n: 03 is strikingly interesting since the respondent attributed this non-fluency to no other psychological factor, but rather, her inability to speak is owed to, still according to her, a lack of exposure to the English language outside the classroom. In other words, the student assumes that the issue in question is due to the lack of practise outside the classroom; the thing that that is quite true especially if we take into consideration that the learners in the Teacher Training School of Constantine have just three hours per week as a session devoted to speaking, whereas the rest of the modules do not really require massive participation.

At last, the fifth proposition reflects the idea that the inability to speak is owed to the learners' efforts that are judged to be insufficient. Yet, we believe that being fluent has nothing to do with the preparation of the subject matter that is to be discussed in the classroom; for; we can be fluent to tackle different and general issues about the solar system, as an example, without having detailed information about it.

**Item 08**

-What are the media frequently used by your teacher during the speaking session?

**Item 09**

-Which Medium you think is the best to help you improve/enhance your oral performance? And why?

The aim behind these two items (08 and 09), is a try to find an eventual relationship between the student's learning style and the ability to speak. One way to reach this targeted objective is through highlighting the technique or the media they prefer to be used by their instructor while teaching them speaking.

What is noticed while reading the respondents' comments is a kind of agreement among the learner that no speaking can take place without linking the latter skill to listening. In fact, the respondents' comments to item 08 are not really what we expected. Instead of mentioning media the teacher frequently makes use of while teaching speaking, most of the learners mentioned some media which we judge to be more related to a listening session. Among the media the learners referred to, we can list: TV, data show, tape recorder, headphones, speakers, MP3 player, videos,

computers, lap tops. Few are those who talked about flashcards, blackboards, realia or any kind of media that is more relevant to speaking.

It can be assumed that learners have mistaken listening media for those of speaking, or simply, they cannot differentiate between speaking and listening ways of learning. Another possibility could be the fact that the respondents believe that the only way to speak is first to listen (to be exposed to an input to enrich one's vocabulary).

In item 09, however, the researcher was more specific while asking the respondents to identify the media they appreciate more to use in the speaking skill session. Again, learners mentioned listening media, but the kind of media they chose was very common to all of them. They focus on data shows, videos, and computers. This fact leads to deduce two major things: first, most of the target population learners are audio-visual styled; i.e, they can understand what is being taught only if the audio medium is accompanied with a visual one like movies. Second, the choice of media learners opted for reflects their increasing interest in using technology while being taught. This interest can generate motivation, the concept that is believed to be very essential in any kind of learning process.

As mentioned in chapter I, a style is defined to be the person general approach to learn, and therefore to solve a problem. Most of the respondent learning style is the one that combines the auditory material to the visual one so that the understanding of the subject matter would be successfully achieved. This notification can constitute the ground for a foreign language teacher about how to prepare speaking skill lesson content. In this case, for example, and since the target population predominant style seems to be audio-visual, the teacher can prepare an audio content that is accompanied with its visual equivalent so that the message will be crystal clear in the learners' minds.

Probably, it is for that reason learners begun by mentioning listening skill media instead of those of speaking. This may explain their wish for a combination in the teaching of both listening and speaking that should be supported by media that is audio-visual.

**Item 10**

-Does your teacher promote participatory techniques in teaching English?

a- Yes

b-No

This question aims at finding out whether or not learners are aware of the importance of one of the most significant technique that promotes speaking, which is interaction. Also, it is purposefully asked to see, through the learner's eyes, the extent to which oral expression teachers are making use of such a technique. The answers are as follows:

| | |
|---|---|
| Yes | 120 |
| No | 14 |

**Table 5.4- Interaction in the Classroom**

As expected, the respondents share the idea that the only way to promote speaking is via interaction or communication. Communication has always been the way throughout which one can observe language being operated and processed at all levels and dimensions (tone, intonation, stress…), expressing at the same time different emotions and reactions in different situations. Communication can also be a very

effective way to promote language development since it allows more practice and exercise amongst the learners in the target language.

Robson (2006:107) reported that "the ability to use language to communicate and to make sense of experience is a uniquely human attribute". This implies that communication is one of the functions of language that is used by people to exchange their ideas. In that respect, Baker and Gaut (2002:19) wrote that we use language to fulfil three major gaols, among which they mentioned communication or interaction. To define the latter concepts, the authors proposed that interaction "focuses on the sharing and communication of ideas and emotions". Again, this stipulates that while interacting or communicating, we exchange different kinds of information that would enrich the communicators knowledge background at all levels, including the linguistic one (through the acquisition of new vocabulary items, correcting some previous wrong knowledge etc…).

In item 10, the great majority of the respondents admitted that teachers do promote participatory techniques, or in simpler words interaction in the classroom during the speaking skill session. This suggests that almost all teachers of the module are aware of the relevance of interaction as a crucial medium to, not just exchanging knowledge and developing their thinking, but also to promote language itself in the classroom.

To illustrate the meaning of the participatory techniques, Jordan et al (2008:192) proposed that spoken language can be explored in six headings:

-Exposition, where the teacher describes, informs, or explains.

-Question and answer exchanges.

-Discussion and pear talk involving the whole class or small groups.

-Listening where pupils listen to the teacher or to each other.

- Reading.
- Writing;

These six axis reflect the idea that interacting in the classroom requires not only talks among students, but also it is extended to include the teacher's role, books, and even learners' own written production. As an example, exposition implies that to be able to fluently express one's self, the learner is in need to be exposed to an amount of information to have linguistic background knowledge to be reproduced. In the classroom, this could be achieved only if the teacher meticulously selects the content of the lesson that should be clearly and explicitly introduced to the learners.

Question and answer exchange has always been the central point of interaction in any academic context; since to initiate any conversation, a teacher has simply to ask interesting and motivating questions to attract the learners' attention and encourage them to participate, hence assuring a positive atmosphere for interaction to occur.

Discussion and debate are also fundamental tools of promoting interaction and therefore allowing more linguistics practice by the learners. According to the authors, discussions could involve the whole members of the classroom or just small groups depending on the nature of the lesson.

Concerning the next point related to listening where learners listen to the teacher or to each other, it is about the teacher's role and attitudes when interaction takes place. In this respect, while listening to what is being said, a teacher could intervene from time to time to regulate the direction of the conversation, correct oral errors and mistakes if possible, agree or disagree with students' opinions and point of views etc…By doing so,

the teacher is not just helping learners in developing mental images of reality (thinking), or to make sense of what is learnt, but more importantly developing learners' linguistic vocabulary as well as their cognitive and communicative competences.

The two last points that are related to both reading and writing seem a bit paradoxal. How could two different exclusively graphic skills contribute to the development of an aural skill? As for reading, Jordan et al (2008:195) stipulate that, from a behavioural point of view, there is what is referred to as a phonic method of reading. Throughout the latter method, learners are supposed to read aloud words, sentences texts, and then to decode their meaning by sound. This totally contradicts with the whole-word method of reading that emphasizes the notion of understanding the meaning in accordance to the context. Yet, and as far as the objective of the present research paper, which is to promote learners' oral proficiency, the phonic method seems very practical. Though it is disadvantageous in the sense that it is very technical and demotivating, and learners could just say words which they ignore the meaning, it gives them the opportunity to read a wide variety of texts, the thing that would allow more practice, and inevitably, would lead to fluency.

Concerning writing, still according to the same author, "it is a tool of thinking, since it encourages self-regulation, reflection and the drawing of memory and past experiences" (p.195). This implies that writing as well as reading are two skills that help promoting other cognitive skills like memory. This leads us to deduce that writing indirectly promotes speaking in the sense that it makes an active use of the different mental processes like thinking ( when understanding the meaning of the words) and memorization (keeping those words in one's vocabulary repertoire). When the learner processes enough vocabulary items, the meaning of which is well understood, speaking

would be a very easy task to be achieved since the vocabulary item are well retained: semantically speaking in long term memory and acoustically speaking in working memory.

**Item 11**

Does this help you acquire, and then keep new English words in your minds to be used when necessary?

a- Yes
b-No

The objective behind item 11is first to know if interaction in the classroom is beneficial for learners, i.e, does it help them develop their speech through an active practice of language exchange and therefore, acquisition of new vocabulary items. Second, item 11also aims at smoothly orienting the targeted goals of the questionnaire items to cover, in addition to speaking, another psychological concept which we believe to be very crucial in promoting speech, that is memory.

In fact, while considering the respondents' propositions, we found that a total number of 115 students ticked "yes", and the remaining population, about 19 students, ticked "no" as shown in the following table:

| | |
|---|---|
| Yes | 115 |
| No | 19 |

**Table 5.5- Interaction and Memorization Relationship**

For a better understanding and analysis of item 11, we have proceeded through relating the results of the same item to the preceding one (Item 10). Hence, we obtained two categories:

**-Category 01: Students who ticked "No" in item 10 (14 respondents)**

Among these 14 students, just one ticked "yes" to item 11. These results are very enthusiastic and positive as far as the objectives of the present questionnaire are concerned. It is expected that those learners who believe that their teachers do not promote interaction as a technique to enhance them to speak (item 10), would inevitably tick "no" for item 11 simply because the latter item intends to show whether or not learners could keep new vocabulary items in their minds through the means of interaction. In fact, the researcher was very satisfied to notice that learners answers do correlate with her expectations. As for the one who ticked "yes", it is believed it to be a randon tick. For, it makes no sense to be aware that the teacher does not rely on interaction as a means to teach speaking in the classroom (item 10), believing at the same time that interaction help them to keep new vocab items in mind.

**-Category 02: Students who ticked "yes" in item 10 (120 student)**

They were 120 students among which 114 confirm that interaction is very essential in keeping the newly acquired vocabulary items in their minds. Six, however, argue that interaction is not sufficient to help keeping vocabulary in their memory system to be used when necessary.

**Item 12**

-What does your teacher do to teach you new vocabulary?

This item intends to show whether or not the teaching of vocabulary is part of the speaking skill session. Also, it aims at revealing what the techniques the instructor often makes use of to teach vocabulary to English language learners in the Teacher Training School of Constantine.

Before tackling the issue as seen and considered by the respondents, let us first consider the relevance of vocabulary acquisition in developing speaking.

In recent years, researchers' interest in vocabulary acquisition considerably increases especially when it is question to second and foreign language learning. Lightbown and Spada (2006:97) observed that unlike first language vocabulary acquisition, in which children acquire thousands of words with little effort, Second language learners' task to learn vocabulary is quite different. The authors stipulated that this is due to the fact that they are not exposed to a context in which the target language is being used. This led the authors to deduce that one crucial factor contributing to an effective vocabulary acquisition process is the frequency with which the word is seen. In other words, the more frequent they use a particular word, the more this latter would be consolidated in their memory system.

This implies that learning vocabulary happens in different ways. Read (2000:39) two effective ways related to foreign language vocabulary acquisition. The first one is called the Incidental Vocabulary Learning; which outlines that subjects are required to acquire knowledge about the language, words in particular, when they encounter them while reading texts or listening to some activities. In this respect, learners are exposed

to a vocabulary input, which they are supposed to understand the meaning in accordance to the context, without being told that they would be questioned about those learnt vocabulary items.

The second way of learning vocabulary, and which correlates with the core topic of the present research paper, is the Systematic Vocabulary Learning. According to Read (2000:40), this method involves learners to memorize both form and meaning of words. These latter are presented to them in two lists: one list incorporating L2 words, and a second one containing those same words equivalents that are translated into L1. The author, then concluded the following points:

- Words are acquired differently largely depending on the degree of their difficulty (eg nouns are easily acquired compared to adjectives).
- To be able to memorize, learners are in need of mnemonic techniques that would facilitate the whole memorization process.
- Some kinds of words are easily acquired when they are associated with each other like opposites.
- Some difficulties in vocabulary acquisition often occur when learners confuse L2 words that have the same form and pronunciation.

Yet, what attracted the researcher's attention are two further points suggested by the author and that serve the purpose of the present investigation. The first one is about storage of words. Read (2000:40)believes that a long storage of L2 words in the memory system is the one that is based the understanding of the meaning of the words rather than depending on sounds and some acoustic codes. This also implies that the author is raising the issue of long term memory contribution to vocabulary acquisition. As seen in chapter 02, long term memory guarantees a long storage of words, the

meaning of which is understood without fearing losing it from the system (a function commonly performed by semantic long term memory). Nevertheless, Storage using acoustic codes happens at the level of working memory (see chapter 03). The researcher has come to a conclusion that the duration of storage of words at that level is very short, and that vocabulary items could be quickly lost from the system if it is not constantly rehearsed.

According to what is reported above, long term memory is more effective to the development of speech than working memory. However, our scope is how to utter words regardless to the way these words are stored in the memory system. It is true that a larger repertoire full of L2 vocabulary items, like the one of long term memory, is very essential to speaking. Yet, those words are to be uttered so that they serve to something. This fact could be achieved just by working memory, the function of which is keeping knowledge about sounds (sounds that make vocabulary items pronunciation possible) to orally produce it whenever necessary.

Again, this leads to the second interesting point proposed by the author, which is about retrieval. He suggests that to be able to retrieve words from the system, learners need to repeat or rehears the words to themselves many times. This is the major function of working memory, which keeps sounds in its very small repertoire through the process of rehearsal.

Hence, thanks to item 12 deep analyses, oneis able, by now, to associate the development of speaking skill to the process of memorization as a whole, and the actual performance of speaking to working memory, since it is the one responsible for handling acoustic knowledge.

The respondent gave many suggestion related to their teachers' different ways in teaching them vocabulary. In fact, most of the target population members share the idea that the major way to do so is via listening to songs or watching videos of native speakers, and then they are asked to fill in the gaps with the missing word (basically related to the systematic vocabulary learning).

A female 4th year student proposes a very interesting comment related to the same issue. She wrote:

> "…..For instance, in second year, our teacher used to provide us with games and jokes, each time we encounter a new word, he explains the term, write it on the blackboard, and asks s to write it down on our copybook".

Another student, however, amazingly writes what follows:

> "Learning new vocabulary was enjoyable with my teachers, we used to play vocabulary games and have competitions especially when asked to guess a hidden word"

In this second case, the learner, not only suggests two techniques of teaching vocabulary, games and guessing, but also shows that the acquisition process was enjoyable, reflecting that the so called teacher uses his techniques through a very motivating way (competition).

The last straw was an astonishing answer proposed by a 22year old girl studying 4th year. She wrote: "My teacher used to bring objects with him to the classroom to teach

us vocabulary. Apart from that, he used pictures, flashcards and games. They are beneficial".

This student raises the issue of a medium that is very efficacious in teaching vocabulary that is realia. This latter is believed to be concrete objects that could be brought to the classroom to illustrate something. This considerably helps learners to permanently keep the item in their memory systems by creating an association between the word and the object. This fact is believed to be very useful to facilitate the retrieval process.

Another comment proposed by a third year student is quite different from her friends'. She almost denies the teacher's role in vocabulary acquisition, and instead, she assumes it to be a very autonomous task that is to be performed by the students themselves. Here are her words:

> "We are studying English at the ENS not in the middle school. We do not use flashcards, but when the teacher is explaining new words we encounter, we ask about their meaning or we check it in the dictionary, or sometimes, we bring idiomatic expressions or we play games"

The sum of all that is that, thanks to the respondents' answers, which are so varied, we are able to deduce many of the vocabulary teaching techniques used by the Training School teachers of Constantine to facilitate the acquisition of vocabulary items and therefore developing their oral proficiencies. Among these techniques the following could be listed: playing games, using flashcards, listening to songs or short stories,

guessing, watching movies, writing lists of words in a notebook, and checking their meaning from time to time in dictionaries and reading as put by one of the students: "…sometimes they ask us to read, and then to answer some questions about the text".

**Item 13**

13- Does your teacher use some techniques relying on memorization to help you to effectively learn new vocabulary?

a-Yes

b- No

This question directly and explicitly raises the issue of memory contribution to speaking development. The objective is to know whether or not learners are aware of the memory techniques, if any, used by their teachers. The results are illustrated in the following table:

| | |
|---|---|
| Yes | 74 |
| No | 58 |
| Abstention | 02 |

**Table 5.6- Memory Techniques in the Classroom**

A total number of 74 respondents assume that their oral expression teachers make use of some memory techniques to teach them vocabulary. Two (02) students abstained (they provided neither options). May be because they do not know what a vocabulary memory technique means, or simply, they could not find a context in which they observed their teachers focusing on memory techniques. 56 students, however, which is

in fact a considerable ratio, confirm that no memory technique is used by their oral expression teachers in the classroom.

Although almost half of the population assume that no memory technique is used by their teachers -the thing that is quite deceiving and disappointing- it is believed that there must be some of the memory techniques that are implicitly used and to which learners did not pay attention. If we consider the process of learning in general, it is found that the latter aims at gaining knowledge that is to be used when needed. This means that, while learning, the output provided by the learners is just another reformulation of the received input. So is the case of the involved learners when it is question of speaking. If they assure that their English has improved since their first year in the school and that they are daily acquiring new vocabulary items, this implies that they are making use of a previous knowledge that has been extracted back from their memory system each time it is needed.

**Item 14**

-What are your own techniques to keep the newly learnt vocabulary in your mind?

Unlike the previous item, throughout which our objective was to expose methods and techniques the instructor uses to teach vocabulary, the present item aims at showing up the learners own techniques to acquire/learn vocabulary. Thus, the question that is to be raised now: what is the difference between acquiring and learning vocabulary?

Answering such a question leads us first to distinguish between language acquisition and language learning. harmer (2007:50), while tackling the same issue of language acquisition/learning came to the conclusion that the difference lies in the spontaneity and unconsciousness of the former and the student capabilities and

consciousness of the latter. In other words, language acquisition refers to the natural and subconscious process of gaining knowledge without being bound neither to any grammatical rule nor to the assistance and recommendations of the teacher like living within a community in which the target language is being used and unconsciously acquiring the different aspects governing that language without paying attention to the acquisition process.

On the other hand, language learning is a conscious process throughout which the learner sits in an academic context (classroom) to know everything about the different rules governing that language, being aware at the same time, of all details occurring during the whole learning process. The author, then, suggested that language acquisition is very similar to the child's first language acquisition. He also argued that the more we are conscious of those details, the less would be our ability to speak. This is primarily due to the unavailability of knowledge that is generally used while conversing. Subconscious knowledge, however, is easily retrieved and used for spontaneous conversation. In this respect, it is believed that both processes, acquisition and learning, are subject to memory. In both cases it is expected to use something that has previously gained. Yet, the researcher assumes that the easiness of using acquired knowledge, and the difficulty with which learnt information is got back is a matter of easiness/difficulty of retrieval. In fact, one can adopt the idea that retrieving knowledge from the sub-conscious mind (acquired knowledge) is easier and quicker than retrieving it from the conscious mind (learnt knowledge). This is probably due to the easiness of encoding and storage of material in the sub-conscious mind which requires no mental efforts like being attentive and aware of every little detail that is happening around. Furthermore, an acquirer of knowledge is anxiety-free, and has neither to fear nor to assume the outcome of mistakes or errors he/she might commit while speaking. This is

not the case of conscious learning of language knowledge in which process the learner is in need in attention, focus, and understanding of what is being learnt. Hence, thinking about the possibility of misusing those acquired rules would constitute a real source of anxiety.

Going back to the point of vocabulary learning/acquisition, Read (2000:01) posited that first language acquisition happens quickly in childhood, and continues to develop naturally in adult life as a result of experience and interaction. However for second language learning, vocabulary acquisition is more conscious and effort demanding. In fact, learners in this case are aware of their vocabulary abilities as well as their limitations. In this respect, the author concluded that second language acquisition means learning vocabulary that is why learners always strive to learn by heart lists of L2 word and vocab.

As for the respondents' answers and comments to item 14, it is noticed that the techniques they used confirm the already suggested supposition stipulating that language acquisition means learning vocabulary. While talking about their techniques, it is felt that learners have already set up objectives about how to retain vocabulary items that are frequently exposed to in their memory systems. These are some of their propositions:

- "…through using the acquired vocabulary in speaking or while writing essays, noting them down on notebooks and from time to time revising them".

This student, within this simple statement, provides three techniques for vocabulary retention: practice (while speaking or writing), memorization (writing vocab items on a note book), and repetition (from time to time revising and reviewing them).

- "I put them in a new sentence through giving examples".

As a technique to remember the new learnt vocabulary, this student creates an association between the words and their meaning through making sense of the word within a sentence that is of his/her own conception.

- "I read the new vocabulary many times".

In this case, it is a purely memorization technique, since the learner repeats reading the words until he/she is able to remember them.

- "I make flashcards and stick them in my room's wall. They must be coloured. Also, I tend to use them while speaking with my friends".

The latter student, in addition to practice and repetition, she suggests the use of flashcards that must be coloured reflecting at the same time her learning style (visual). This also may suggest the relevance of learning styles on choosing the appropriate learning strategy to retain vocabulary knowledge in their minds.

- "I try to check in the dictionary to know the meaning of a word myself…I try to use them in my speech or writing"

This respondent, however, in order to retain a vocab item, relies on understanding its meaning by checking it in a dictionary. This probably means, that in such a case, the retention process occurs in semantic long term memory, since she relies on meaning

understanding. In addition to that, the same student added other techniques like practice either while speaking or writing.

The respondents' comments to item 14 were so interesting and varied that we made sure to carefully read all of them. The majority agree on the following points:

Among the techniques the target population proposed to keep vocab item in their memory systems are:

- All kinds of memorisation techniques that ought to be supported by technology.
- Repetition.
- Frequent practice.
- Checking the meaning in dictionaries or in their smartphone dictionaries.
- Writing the new learnt and difficult vocabulary on note books and revising them from time to time.
- Using flashcards.
- Using the new vocabulary while conversing or in their writing.
- Recording the new vocabulary on their phone-note pad.

**Item 15**

Are you able to remember the learnt vocabulary after a given period of its acquisition?

a- Yes

b-No

**Item 16**

16- If yes, explain why?

**Item 17**

17- If no, state the reasons behind your forgetting. ?

These three items are closely interrelated. Their aim is first to know if the intensive use of the already suggested techniques help learners keep the newly learnt words in their minds. If it is the case, learners are required to state the reasons behind that. If they fail in remembering, they are also asked to state the reasons behind their forgetting. The results to item 15 were as illustrated in the following table:

| | |
|---|---|
| Yes | 86 |
| No | 58 |

**Table 5.7 Remembering Vocabulary**

Throughout these items two issues are raised: the one of remembering and the other one of forgetting. In fact, we have to give equal consideration to both concepts. It is true that. In fact, we have to give equal consideration to both concepts. It is true that we remember past experiences, yet, this does not mean that the process of remembering is that perfect. Taylor et al (1970:399)reported that "much of everyday experience leads to suppose that retention of past events is far from perfect ….. and varies in amount and quality, both from person to person and within the same person at different times". In this respect, we can assume that the reason behind learners' good and bad speaking performances is due in their differences in the way they memorize or remember.

No one denies the fact that all human beings forget, or in simpler words, they recall in different ways. Some are able to remember 90% of a particular event, others could recall 40%, whereas others are not able to remember anything. The assumption is therefore, non-fluency in foreign language learning is particularly due to students' failure in remembering learnt vocabulary items. Thus, as foreign language teachers, we are supposed to look for ways or finding out solutions to the present problem through making use of massive memory strategies to learn the foreign language vocabulary. By doing so, learners would be able to retain more words, enrich their vocabulary repertoire, and thus finding no problems when speaking.

Forgetting, as stated in the second chapter, is the inability to retrieve information and that is basically due to time passing. It has also already been stipulated that it happens at two levels: in long term memory as well as in short term/working memory. In the former case, it is believed that forgetting happens because of time passing, and throughout which the information is supposed to be in the system, yet, the individual is unable to recall it because it has been there for a while. The second reason behind forgetting in long term memory is due to interference, where the recent information competes to take the place of the ancient one. Consequently, it is supposed that the solution against time effect on knowledge acquisition in long term memory is practice and repetition. Also, the learner ought to be exposed to different kinds of inputs in order to refresh his/her memory.

The scope of the present study, as previously mentioned, is about working memory and how to defend knowledge present at this level against forgetting. Therefore, what we are supposed to do is to prevent knowledge loss from that system that is

characterized by having a very small capacity and keeping information for just a very short period of time.

Forgetting in short term memory happens for the same reasons: time decay and interference, but in different ways. Unlike long term memory, short term memory capacity is very small and short. (see chapter 03). This means that it could receive just a given amount of knowledge. Also, it has alreadybeen suggested that knowledge in working memory is kept for a very short period of time, and then if not rehearsed, would be lost from the system.. For this reason, it is believed that to help working memory rehears the maximum of knowledge, and therefore keeping it there the time needed to be encoded and then sent to long term memory to be permanently kept there, one should focus on attention. Woolfolk (2004:246) argues that if we do not keep paying attention to the information, the activation levels decay and continuous weakening until the information cannot be reactivated again.

While analysing item 14 results in relationship to what has been said so far, we did it

in two phases:

**Phase 01:** Students who confirmed that they could remember (they were 86)

Most of these learners category, while providing the causes behind their success in remembering, they attributed this fact to basically two reasons: practice and understanding the meaning of words and sentences they are exposed to. In this respect, students suggest the following;

-a fourth year student writes:

> "I can remember the new vocabulary which I have understood the meaning successfully, and which I use frequently in speaking or writing. However, few words cannot be remembered especially when I cannot understand the meaning"

Another third year student also writes:

> "Because I like keeping using them frequently. And because I prefer to use new vocabulary in my oral and writing. So it is quite intolerable to forget them."

A 23 year old student amazingly adds:

> "I think I can remember the learnt vocabulary because of concentration and paying attention to the teacher. I believe once we are attentive you can memorize things and when you are not, you tend to forget".

A third year student simply suggested:

> "Because I revise them regularly"

These four students, as well as the whole population respondents, share the idea that practice is the key to remember words and vocabulary items. In other words, practice or exercise is very important in retaining knowledge in both memory sub-systems: in long term memory, in which case the former process (practice) is referred to as repetition; and in working memory, in which case it is often called rehearsal.

However, it is observed that most of the respondents rely on understanding the meaning of words as another technique to keep information in their minds, in particular in their long term memory (semantic memory). The proof of that is the fact that the great majority of them stipulated that they have to understand the meaning of the word or checking its meaning in the dictionary or using it while speaking or writing.

Still, we keep believing that retaining knowledge (vocabulary items) in long term memory is a quite long process and does not facilitate the process of speaking. In fact,

retrieval from long term memory is longer than the one from working memory. Besides, one can estimate that spending time in checking the meaning of just one item to safeguard it in long term memory, would allow interference to occur in working memory (that is normally responsible for a quick acoustic manipulation of words). Thus, to retain one word in long term memory, the student might have lost two or three others in working memory. Interference occurs here because the leaners' attention is directed to know the meaning of a particular word, while sounds are being handled in working memory in a very rapid way. Since the learner is occupied in knowing the meaning, no rehearsal occurs in working memory. Knowing the characteristics of the latter system, this fact leads to the decay of other items within the few seconds that follow. However, if the learner's attention is directed towards the sounds; i.e, keeping talking and using the language intensively without caring about the meaning of words, this would allow an active rehearsal in working memory and thus filling the learner's repertoire with many words and items that are well pronounced and uttered. As for meaning, ones the words are acoustically encoded in short term memory, learners would have time to curiously look for the meaning of those words and therefore storing them twice, first acoustically in working memory and second semantically in long term memory allowing at the same time a very successful acquisition of vocabulary items.

This makes the researcher remember her own experience as well as old classmates' in the primary school while learning French as a second language. In fact, everybody had a tough teacher who used to oblige the whole classroom to learn by heart different texts and songs (recitations). The thing that was done successfully and in a perfect French pronunciations. Everyone was very glad to notice how brilliant he/she was while singing in such good French especially while honouring our teacher's efforts in front of guests and inspectors. Nevertheless, and as far as the researcher's own experience is

concerned, no one really realized the meaning those songs carry. Nowadays, it happens to me to sing to my daughter these same songs, which I remember perfectly, but this time I enjoy both: the good French pronunciation as well as their fabulous meaning.

**Phase 02:** Students who confirmed that they forget the learnt vocabulary items (they were 58 students)

In fact, we were so excited to know the learners' reasons behind their inability to remember vocabulary knowledge. Their comments, though differ in terms of structures and objectives, they share many points in common. The following are some of the learners' comments to item 17 and which were randomly chosen:

**1-**"Those which I forget are mainly complex or difficult words, or I face them separate and not in context"

**2-**"Sometimes I find difficult words that are difficult to remember. I guess the nature of the word contributes a lot in memorization"

**3-**"Because I might be exposed to many words that are too much to me to remember, or those words are taught in isolation".

**4-**"After a period of time, I cannot remember the new vocabulary I learnt before. I first remember the ones that I review very well and using them while communicating. The other vocabulary I forget is because I did not pay attention to it, or because it is not interesting".

**5-**"I attribute the fact of forgetting the learnt vocabulary to lack of the use of language. Also lack of interaction with others".

**6-**"I do not often revise the new words I acquired and I do not use them in daily discussions. Also, I do not read books a lot".

**7-**"I forget some words because of the difficulty of their pronunciation or their unfamiliarity".

**8-**"I have a bad memory

-I do not remember words that are unfamiliar, or do not have an equivalent in Arabic.

-Words that have similar spelling represent a source of confusion because I rarely remember the different meanings".

**9-**"I lately face difficulties in memorizing vocabulary though I am using the same techniques I have always used. I generally end up with failure. May be I lost that big interest I had before".

It is observed that the majority of learners agree that the lack of practice (which they referred to as revision, review, using language while speaking), is the main reason for forgetting.

Another interesting reason that attracted the researcher's attention is the difficulty of words' pronunciation or the unfamiliarity of the student with the new item. In fact, and by experience, it is known that difficult words are commonly characterized by being complex and long, are very difficult to retain. Yet, what interesting is may be that difficulty is due to the unfamiliarity of the learners with the sounds making the word in question especially in foreign language learning (there are some sounds in the mother tong that do not exist in the foreign language and vice versa). This would pose a

problem to working memory that handles the word acoustically especially when meeting a new sound for the first time.

Another reason to forgetting, still according to the respondents, is again due to meaning. Some learners still confirm that without understanding the meaning of different items, they are unable to retain them. It is assumed that concentrating on meaning could pose a real problem to the whole memorization process. In comment 10, the respondent assure that some words have the same pronunciation, thus, when relying on meaning to remember, she gets confused/ In fact, if she had just concentrated on the sound (pronunciation) memorization would have been easier, rather than remembering columns of definitions and interpretations of each vocabulary item.

Comment 07emphasizes on pronunciation. The student in question argues that words whose pronunciation is not common, is difficult to keep in mind. This in fact is a clear declaration, of the role working memory plays in developing speaking. When learners are exposed to words, the sounds of which are strange, they are likely to be rejected by the system.

Other students attribute forgetting to lack of interaction in the target language. It is quite true, because despite the fact that learners are given the opportunity to speak in the classroom, it is not sufficient. More practice is needed.

Another proposition was the one of making use of the mother tongue (Arabic) to be able to remember the meaning of words, and hence keeping it in the system.

In comment 03, the learner is complaining about the amount of words she is often exposed to. This could have two interpretations. The first one may be the learner herself has a small working memory capacity, in which case she fails in handling the huge

amount of vocabulary items. Second, this also may be a real situation of interference. Being exposed to many item sounds at ones, would lead these latter to compete in the learner's head. Thus, the first recent ones would be remembered whereas the remaining ones would be lost from the system.

At last, other learners link their forgetting to motivation. They report that the fact of not being interested in the subject matter inevitably leads to a total unconcern in the whole process of learning like in the case of comment 09.

**Item 18**

-How do you do to keep knowledge about the learnt vocabulary in your mind?

a) Create mental association
b) Apply images and sounds
c) Reviewing well
d) Employing actions
e) Analysing or reasoning
f) Creating structures for input and output
g) Arranging and planning your vocabulary
h) Evaluating your vocabulary acquisition
i) Lowering your anxiety
j) Encouraging your self
k) Interacting with others
l) Empathising with others

Item 18 is a question that aims at distinguishing between the different language learning strategies of our population respondents. It also targets the issue of whether or not these same respondents make frequent use of some language memory techniques, or they rely on other strategies to cope with language knowledge they are expected to.

Before revealing the respondents' results, let us first consider the structure as well as the options and categories proposed in item 18. First of all, the question addresses the population learners asking them to choose, among the strategies provided, the one (ones) they frequently make use of to keep language knowledge, vocabulary items in particular, in their minds. On the other hand, there are twelve strategies which have been adapted and developed in accordance to Oxford's own classification of the different language learning strategies she proposed (Oxford1990:17). What is very interesting about these strategies is the way the author categorized them. She first divided the language strategies into two categories: direct and indirect. Then, she further subdivided them into six language learning strategies. Thus, what was obtained were three direct strategies three other indirect strategies.

The three direct strategies include:

- Memory strategies
- Cognitive strategies
- Compensation strategies

The indirect strategies, however, include:

- Meta-cognitive strategies
- The affective strategies
- The social strategies

This categorization, which is judged holistic and includes all aspects the learner needs while learning (psychological, social, affect, behaviour, cognitive and meta-cognitive), is going to constitute the major framework classification of the language learning strategies that should be given to our target population. In fact, in the original version Oxford proposed, there were six strategies (three direct strategies and three other indirect strategies) which were subdivided into a total of 19 strategy sets (Oxford,1990:17). Therefore, from each of the 19strategy sets, the researcher has chosen some (12 strategy sets) which are believed to be widely used by foreign language learners. So, for the memory strategies, four memory techniques are suggested:

- Creating mental association
- Apply images and sounds
- Reviewing well
- Employing actions

For the cognitive strategies, two categories are proposed:

- Analysing or reasoning
- Creating structures for input and output

As for the affective strategies, there were two propositions:

- Lowering anxiety
- Encouraging one's self

Concerning the meta-cognitive strategies, two options have been provided:

- Arranging and planning your learning

- Evaluating your learning Acquisition

Finally, the list ends with two social strategies:

- Interacting with others
- Empathizing with others

The final organisation and structure of item 18 is therefore:

-a-b-c-d are memory strategies

-e-f are cognitive strategies

-g-h are meta-cognitive strategies

-i-j are affective strategies

-k-l are social strategies

Respondents' answers and suggestions are as illustrated in the following table:

| | | |
|---|---|---|
| **Memory strategies** | Creating mental association | 91 |
| | Apply images and sounds | 62 |
| | Retrieving well | 49 |
| | Employing actions | 25 |
| **Cognitive strategies** | Analysing or reasoning | 47 |
| | Creating structures for input and output | 34 |
| **Meta-cognitive strategies** | Arranging and planning your vocabulary | 30 |
| | Evaluating your vocabulary | 35 |
| **Affective strategies** | Lowering your anxiety | 12 |
| | Encouraging yourself | 47 |
| **Social strategies** | Interacting with others | 98 |
| | Empathizing with others | 22 |

**Table5.8: Language Learning Strategies**

**NB:** Again, we confirm our presence when the learners were responding to the different items. We also made sure that they have understood the meaning of all those psychological factors. The thing that was very easy since learners assured that that they have already dealt with the already mentioned language learning styles and strategies in different modules like TFL, Psychology and reading techniques. Also, we attracted their attention to the point that they can choose more than one strategy if they are making use of many of them while learning.

While considering the respondents' answers, the first remark which attracted the researcher's attention, and which has been really appreciated, is that each respondent of

our target population makes use of at least three strategies at ones. This believed to be very positive because diversity in language strategies use inevitably leads to diversity in the way learners handle knowledge (creativity).

Second, the strategy, which the population respondents believe to be crucial in vocabulary acquisition, is the social strategy: interacting with others (98 ticks) followed by the memory strategy creating mental associations (91ticks). The third and fourth positions were also related to other memory techniques, Applying images and sounds (62 ticks) and reviewing well (49ticks), followed by the affective strategy encouraging yourself (47 ticks) and analysing and reasoning (47 ticks). Another cognitive strategy, creating structure for input and output (35 ticks) came on the sixth position, whereas both of the meta-cognitive strategies: evaluating your vocabulary (34 ticks) and arranging and planning your vocabulary (30ticks) came on the seventh and eighth positions respectively. The memory technique "employing actions" was on the ninths position with 25 ticks, then the social strategy empathizing with others (22 ticks). The affective strategy, lowering your anxiety came on the last position with just 12 ticks.

In brief, the final order of the language learning strategies as chosen by the target population is as follows:

- Social strategy: interacting with others (98 ticks)
- Memory strategy: creating mental associations (91 ticks)
- Memory strategy: Applying images and sounds (62 ticks)
- Memory strategy: reviewing well (49 ticks)
- Cognitive strategy: analysing or reasoning (47 ticks)
- Affective strategy: encouraging yourself (47 ticks)
- Meta-cognitive strategy: Evaluating your vocabulary (35 ticks)

- Cognitive strategy: Creating structures for input and output (34 ticks)
- Meta-cognitive strategy: arranging planning your vocabulary (30 ticks)
- Memory technique: employing actions (25 ticks)
- Social strategy: Empathizing with others (22 ticks)
- Affective strategy: Lowering your anxiety (12 ticks)

This order of language learning strategies that has been elaborated on the basis of the target population choices reveals that nothing can substitute communication or interaction in both acquiring new vocabulary items through the exchange of ideas and information, and keeping those vocabulary items in our minds since interaction allows both exercise (practice) of newly acquired words and reviewing them as well. Thus interaction is a general process that helps in developing language acquisition. Still, it is somehow linked to memory, because, while interacting with others, subjects usually make use of already acquired vocabulary items. This implies that these latter are kept, at least for a given period of time in our memory system. As for the actual use of words that happens while interacting, implies the assumption that learners are using two of the widely known strategies that generally help in consolidating knowledge in the memory system that are reviewing and practice. Hence, although, interaction is a quite social strategy, it is closely related to other memory strategies without which no communication would take place.

On the second, third and fourth positions, the respondents consecutively chose three of the suggested memory strategies that are: creating mental association (91), applying images and sounds (61), and reviewing well (49). In fact, it is a real evidence that memory strategies are very important in the process of vocabulary acquisition. This also highlights the very significant role memory plays in language acquisition/learning in

general; and speech development in particular. The great majority of learners chose at least three (out of the four provided memory strategies) as their first choices. The fourth memory strategy, employing actions, however, came at the ninth position (25). It is a memory strategy which involves the learner to act while learning/memorizing, so that while retrieving, the learner would recall the action that accompanies a particular information, and which would inevitably lead to remembering the word or the vocab item in question. It is a strategy that is commonly used by kinaesthetic learners, who learn best through a hand-on experience. (see chapter 01). This kind of learners, for instance, instead of passively receiving knowledge from the teacher, they are supposed to actively contribute to the learning task and have their share in doing the course. Yet, it is believed that kinaesthetic learners are rare in language learning domain. The most predominant language learning styles that are widely observed are those of the audio and visual learners.

As for the three first chosen memory techniques, which came on first, third and fourth positions are:

1-Creating mental association, which stipulates the idea that to remember something, a learner is supposed to associate it with a picture, an experience, a concept or even with a mother tongue word. It is very helpful for remembering, because those associative objects or means serve as cues that would successfully trigger the retrieval process.

2-Applying images and sounds: again, it is a strategy commonly used by visual and auditory learners respectively, i.e, to remember a word, the visual learner, as an example, is supposed to transform the information into a graph whereas the

auditory learner is supposed to acoustically remember the characteristics of the item in question.

3-Reviewing well: or in other words exercising or practicing. It can also stand for revision. This means that the best way to remember what is being learnt is inevitably through revising or regularly consulting what has already been learnt in order to consolidate its position and therefore storage in the memory system.

The sum of all that is, as it may have already noticed, these memory strategies seem very efficacious to keep acquired knowledge, vocab items in particular, in the memory system to be used whenever necessary.

Analysing or reasoning is another cognitive strategy that helps in a massive acquisition of vocabulary through the understanding of their meaning. Still, this strategy has nothing to do with memorization, though it leads to it. In fact, the best way to permanently keep knowledge in the memory system is through understanding its meaning for it helps to reinforce its position in the same system.

The affective strategies also got their share. According to our respondents, and they were 47, believe that they are deeply influenced by their attitudes towards the learning material. In this respect, the issue of motivation is raided. Encouraging themselves to learn, or being encouraged by others could constitute a very relevant factor that leads to a successful learning. A learner could think about the consequences of his learning activities and tasks, and it is on the basis of that, he/she would act. So is the case if the learners are intrinsically committed and completely involved in the learning process. Learning in such circumstances would be a source of pleasure, and thus, what is learnt would be easily understood and kept in the learners' minds.

Evaluating vocabulary, arranging and planning vocabulary and creating structures for input and output are three choices that have been almost equally selected by learners. Arranging and planning vocabulary is a meta-cognitive strategy that is based on the premise that creating a certain mode of knowledge organization to facilitate its understanding. Evaluating vocabulary is another meta-cognitive technique that is related to the learner himself/herself, while judging, as an example, out of hundred vocab items that are learnt within a week, how much he/she is able to recollect. Thus, what is remembered means that it is available and accessible whenever needed. Concerning items that are forgotten, the learners need to review them again so that they would be out of them memory system again. In other words, this strategy stipulates that to frequently check what is the knowledge that is accessible and the one that is not. Being aware of both situations constitutes inn itself consolidating the position of the former in the system and searching and thus remembering the latter.

Creating structure for input and output is a cognitive strategy which is believed to be related to the learners' own mental faculties, and the way they handle knowledge. As an example, a teacher is always transmitting knowledge to the learners. Smart learners are those who would manipulate that knowledge in a way so that they would create their own input structure which they are able to understand; and thus, to easily preserve the in the memory system.

On the two last positions, there is the social strategy, empathizing with others, which is understanding the others' intentions while speaking to assure the continuity of the communicative process. Lowering anxiety, however, is an effective strategy which indicates that the learner's psyche is stable and free from any kind of stress or fear to be able to effectively receive and perceive knowledge.

All in all, and as a major deduction of item 17 analysis, we assume that:

- Interaction is the best strategy via which learners could develop and promote their oral proficiency.
- Memory strategies are of great significance in speech promotion in the sense that they help keeping knowledge about the language in general and speech in particular in the memory system.
- Finally, and regardless to the strategy that is used to while learning, (social, affective, memory, cognitive or metacognitive), they all aim at the same point which is a successful and effective learning.

**Item 19**

-As an English learner, do you think that memory can play an important role in developing one's oral proficiency? Express yourself?

This last item is a kind of deductive question which aims at synthesizing and fusing all what has been found along this questionnaire analysis concerning the relevance of memory in general and working memory in particular in developing learners speaking skill. Learners were asked to provide their opinion or just confirm or disconfirm, out of their own experience, whether or not memory is vital in improving their English oral proficiency.

Learners' answers are divergent, conflicting, and interesting, yet, they almost all agree that there is not the shadow of a doubt that memory is crucial, not only to develop their oral proficiencies, but also to improve all other language skills. This was well illustrated through their own comments to item 19, and amongst which we selected the following:

**Comment 01:**

**“**Memory can play an important role in developing one’s oral proficiency. A good memory helps students remembering the new learnt vocabulary, the different English expressions and idioms, grammatical rules…..It also helps them avoiding the same mistakes. Thus, while speaking, a student can remember all these things, and can produce correct English”

**Comment 02:**

“Memory plays an important role in learning. If a person forgets what he has learnt, he will not make progress in his learning. Concerning oral proficiency, memory enables the person to remember well the rules and vocabulary in order to perform well. In addition to memory, repetitive practice is important; the person has to repeat his newly acquired knowledge in order to remember it well. Personally speaking, I do not remember what I learnt unless I repeat it twice and thrice. Later, it becomes a habit and I get used to it. A person must acquire many vocabulary items to be able to perform the language”.

**Comment 03:**

“The role of memory in developing one’s oral proficiency is undeniable. Using different memory strategies like reviewing, applying images and sounds and creating mental associations are helpful techniques that enable foreign language learners to acquire a good and correct and rich amount of words. I think memory is the heart of learning ……..; however, to keep our memories fresh, workable and good, we have to train them as much as possible using different techniques”.

**Comment 04:**

"Memory helps a lot in developing one's oral proficiency. It is the repertoire of our vocabulary. The more it holds words; the best the person is good at expressing himself. So, memory is of great importance in developing the oral proficiency".

While considering these randomly selected comments, or many others, what attracted the researcher's attention is that general compromise amongst respondents assuring that memory is very crucial in language vocabulary acquisition. This also shows that learners are aware of the fact that improving one's oral proficiency largely depends on having a rich vocabulary background that should be memorized to be used when needed in appropriate contexts. In fact, these findings and results are revealing as far as the objectives of the present study are concerned since they come to confirm our hypothesis about the close relationship between working memory and verbal knowledge acquisition. For Gathercole (1999:134) assures that fact through claiming that short term memory stores the newly acquired items in phonological short term memory. She also stipulates that this fact may serve as a time window over which the item can become efficiently stored in long term memory. This draws our attention to the fact that vocabulary, to be kept in the memory system as a whole, is stored in two different ways: verbally (sounds) in the phonological short term memory, and semantically in long term memory.

All in all, it can be confirmed at last that, in fact, short term memory capacity, among many other factors, considerably contributes to the development of foreign language learners' oral proficiencies. In this respect, Neath et al (1999:386) wrote:

> "Highly significant links were found between children's phonological memory skills as assessed by non-word repetition accuracy, and their knowledge of vocabulary in both native and foreign language."

**Conclusion**

Learners' responses to the different items and their perceptions of the different tackled and handled issues under study, largely helped to suggest that, in fact, some points related to memory issues are of great significance and need to be considered in Algerian context.

Throughout the study and interpretation of the questionnaire's items, it is felt that even though learners are aware of the significant role memory plays in language development (including all its aspects), they do not really train and practice to develop different memory functions like chunking or repetition which are considered to be the best techniques to enlarge the working memory capacity.

It is also remarked that learners are directed towards an interactive approach. They believe that, according to their answers to the questionnaires items, that the best way to improve their oral proficiency is through massive interaction in the target language.

The intention is then, not to underestimate social techniques role (like interaction) to improve speech production in the target language, but rather to underline the fact that memory techniques, if well elaborated and implemented would have satisfactory results in the field of speech production.

# Pedagogical Implementations and Recommendations:

This part of our thesis is an exposition of some recommendations drawn on the light of the research results (both experimentation and questionnaire analysis). In fact, the stated hypothesis targets the objective of proving that short term memory capacity has a crucial role to play in developing language learners' oral proficiency. Besides, it is suggested that knowledge handled could be sent to long term memory to be permanently kept there (the targeted objective of any kind of leaning), there must be a kind of semantic association. It is also stipulated; throughout the theoretical chapters that working memory is an online store responsible for keeping acoustic information active to be easily and quickly retrieved whenever used during the speech act.

In line with this, the following recommendations are suggested, and which, if well taken into consideration and implemented in the EFL classroom, would hopefully lead to a successful speech production in the target language and hence developing learner's oral proficiencies. These might include the following:

1. **Promoting interaction in the classroom:** EFL teachers should give much consideration to the interaction process taking place in the classroom among the learners. That interaction process is believed to be a means to exchange knowledge orally. Besides, it allows the rehearsal of different sounds present in the working memory system. In other terms, while uttering words, the learners rehearse at the same time the different sounds making those words in the working memory system. This could be achieved, for example, through telling stories and discussing the held major themes, allowing at the same time more practice and thus, a successful knowledge storage.

2. **Being aware of the learners learning styles:** If learners have an auditory learning style, discussions, dialogues and debates would considerably help in rehearsing, and therefore in keeping the acoustic knowledge in the working memory system. If they are visual, learners generally, to help keeping the maximum of information, are in need of making associations between the new knowledge and their own mental images and imagery mental concepts. Thus in such circumstances, an EFL teacher should present data in terms of images, shapes and forms in order that learners could consolidate the relationship between their own conception about the presented knowledge, their own understanding and the way of how to reformulate that seen knowledge into spoken language.
3. **Reading:** The latter skill is revealed to be vital in helping keeping knowledge in working memory. In fact, unlike speaking, throughout which learners are unable to remember the very first produced items in a discussion, as an example, while reading, they can underline, highlight or write down specific vocabulary items. This implies that the learners attention is directed back to those highlighted words (the thing they cannot do if they are speaking since, in a discussion, learners are likely to forget the discussion's first heard words after a given period of time). This also allows at the same time, a very fitting rehearsal accompanied with more focus and emphasis on the targeted items. Therefore, this procedure helps not only in keeping knowledge in the memory system, but also consolidating acoustic knowledge in the working memory system.
4. **Maintenance rehearsal and elaborative rehearsal** discussed in the second theoretical chapter are also two psychological concepts EFL teachers should be aware of. As seen in the theoretical part, maintenance rehearsal is a process

responsible for handling information in short term memory. Yet, it is unable to send it to long term memory. Elaborative rehearsal, on the other hand, is another mental process, which is, compared to maintenance rehearsal, more active, since it helps in making sense of the new acquired knowledge, i.e, understanding it and creating a meaningful associations between what already exists and what has just been acquired. Knowing that, EFL teachers could exploit those two psychological features learners are endowed with through presenting knowledge and giving them time opportunities: First, to memorize through rehearsing over time to strengthen the encoding and thus the storage of that knowledge (in most of the time acoustic knowledge) in short term memory. Second, providing learners with more time so that this same acoustic knowledge already handled through the maintenance rehearsal in working memory could be further processed, analysed and then understood, allowing at the same time its successful transfer into long term memory.Hence, assuring a permanent availability of that knowledge in long term memory, and learners would find no difficulty in retrieval that happens at the level of both short and long term memory. Besides, by doing so, learners would not find problems in producing speech since the needed knowledge is available in both long term memory (because of the permanent storage), and short term memory ( that is generally responsible for handling acoustic knowledge frequently needed while speaking).

5. **Encouraging learners to use mnemonic strategies:** In fact, mnemonics, as explained in the theoretical chapters, are developed to help learners to encode and retrieve information. Thus EFL teachers are required to teach their students the maximum of mnemonic strategies. These latter consist of providing students with visual concepts or verbal constructions that serve as cues facilitating the retrieval

process. Probably, the best mnemonic strategy that helps in improving working memory capacity and the processing of knowledge as well is the key word mnemonic. The latter is a method which stipulates that the system, with frequent practice, develops techniques of creating associations between the new word and other words in the mother tongue. A good example of that is to be able to remember the word ‘pan’ in English, the meaning of which is completely unknown for an EFL learner who considers it just as a combination of sounds in English, and relate it to the French word ‘pain’, whose meaning in understood (if French is the mother tongue of the learner). Therefore, what would be remembered is just the sounds making the word ‘pan’. Knowing that working memory is the only store responsible for handling non-words, (or sounds), we can assume that the key word method is a strategy that helps in keeping acoustic information in the working memory system, and thus facilitating the speech production process. EFL teachers are required to be aware of the significance of that mnemonic strategy because it helps, not in enhancing vocabulary acquisition, but also, training the working memory system to handle much more knowledge using clear cues easy to be retrieved, and hence probably enlarging the working memory capacity.

6. **Students who have problems of recalling details of what has been learned few minutes ago could resort to paraphrasing and summarizing.** Students, instead of retrieving all the details or learning by heart columns of vocabulary items within a text, can just reformulate the given knowledge in their own words. In such circumstances, learners find themselves registering information according to their own understanding, and therefore finding no difficulty to retrieve it later on.

7. **Reviewing and revising acquired knowledge before going to sleep at night might be very useful too.** For instance, learners could write down the newly acquired vocabulary with their definition, and before sleeping, they have to revise them. This could be done individually as well as in groups (with classmates, brothers and sisters).
8. **To help learners to better memorize information, EFL teachers should always activate prior knowledge.** For instance, the teacher can start the lesson with a warm up consisting mainly of questions related to the previous lesson content. This is willingly done in order to achieve two purposes: first checking out the amount of knowledge learners are able to recall and second, putting much focus on the non-remembered information through directing the learners' attention towards it to assure its storage.
9. **EFL teachers, while presenting knowledge have to divide it into well organized and understood chunks.** By doing so, learners can receive that knowledge bit by bit, the thing that would inevitably lead to successful encoding and then storage.
10. **Teachers can improve learners' memorization through directing their attention towards the targeted knowledge.** This could be done through encouraging them to take notes of every little detail they hear or judge to be useful. Such practice is very useful to train working memory to remember acoustic information and probably within time, would lead to enlarge the capacity of the system as a whole.
11. **Reducing the amount of knowledge provided to learners:** If EFL teachers feel that learners fail to follow instructions despite they are often repeated, this is directly related to a working memory problem. Thus, what could be done is that

teachers should concentrate on the quality of storage rather than quantity. In other words, the target amount of knowledge that should be provided to learners must be broken into small pieces. When teachers assure that learners have well stored three items out of ten as an example, within one session, it is considerably satisfactory and better than providing the ten items at once knowing that students acquired nothing. If teachers are satisfied with the little amount of information their students hold without caring about the non-achievement of their own teaching objectives, or even about the students incompletion of the task, these would develop a kind of self-esteem, confidence, and motivation to get more involved in the learning task. This also leads to the activation of their attention. In addition to that, by doing so, teachers are avoiding learners' memory over loading, which would inevitably lead to creating a sense of readiness in the learner to move towards further learning.

12. **Incorporating the different and appropriate kinds of media in the classroom:** To teach vocabulary, the EFL teacher can make use of different media that would help in strengthening the presence of knowledge in the system like realia, flashcards, pictures….In such circumstances, the learner would be able to develop an association between the seen knowledge and the new word, the thing would constitute the best cue for encoding and retrieving.
13. **At last, we suggest that the psychological status of the learner would inevitably lead to all those already suggested implications and recommendations combined.** Generally speaking, it is noticed that individuals who are extrovert, field independent (being able to cope with different tasks and problems with/without the assistance of the teacher), and have no problem in

communicating ideas (usually due to shyness or fear), among many other psychological factors, have the tendency to be more self-confident,

This particular section of pedagogical implications and recommendations was designed in order to highlight the relevance human memory system in general and working memory in particular in the teaching of the speaking skill, and thus allowing a better development of the EFL learners oral proficiencies. In fact, when being aware of the different components and features as well as their multi- functions, EFL teachers could take these into account when designing contents to their students. Besides, they can vary the different tasks and adjust them so that they would fit the working memory system properties and functions.

# General Conclusion

In recent decades, learning a foreign language has always been a question of sustained study and investigations. Besides, relating that educational phenomenon to some psychological, neurological and biological concepts lead to the emergence of fascinating and overlapping fields that considerably contributed to the explanation of the whole learning process through a psycholinguistic, neuro-linguistic and ultimately neuroscientific views, each of which attempting to illustrate how different mental faculties, particular brain parts or specific organs are responsible for an appropriate speech production in the target language.

Referring to the aim of the present study, it has been noticed that there is a close relationship between developing learners' oral proficiencies and the different functions of the human memory as a whole and working memory in particular. In fact, the investigation aims at making some useful contributions to the study of a foreign language through highlighting the relevance of learner's memory system (working memory in particular) in speaking performances. To achieve that, a literature review covering over three chapters has been provided in order to demonstrate already existing theoretical knowledge about the subject in question, mainly explaining notions related to speaking, perceptive skills, long term memory, short-term/working memory among many others. Such a background reading considerably helped in the conception of the field work, basically made of two parts: an experimentation related to measuring EFL learner's working memory capacities, and a questionnaire, the aim of which is to correlate with the results of the already conducted experiment and ultimately relating to further eventual contributions of other human memory components, especially long term memory.

The experimentation tested the main hypothesis of the present study, i.e, we tried to see to what extent a large working memory capacity goes hand in hand with a better learner speaking performance. To do that, a non-word repetition test has been administered to English learners in the department of English of the Teaching Training School of Constantine (ENS). Throughout this test, learners were expected to recall a list of fourteen non-sense words in a particular order after rehearsing them for three minutes. Obviously, the number of words remembered would reflect learners' own working memory capacities (taking into consideration that a common human being is able to keep seven plus or minus two items in his working memory according to George Miller's magical number theory). The test results' are then correlated with the learners own grades obtained in their oral expression exams. The results, in fact, were amazing: it is found find that those students who were able to remember more than seven words are good scorers and show no difficulty in producing the language orally. However, those who are unable to remember the non-sense words, their academic scores are deceiving and we observe that they are unable to produce two consecutive words in English. All in all, the non-word repetition test results of this experimentation clearly demonstrate that there is a close relationship between language oral proficiency development and working memory capacity.

Those positive results obtained from the test encouraged the researcher to design a questionnaire to check the extent to which the stated hypothesis is in the right direction. In fact, the aim of the questionnaire is not only to relate a good oral performance to just working memory capacity, but also expand it to other parts of the human memory system like long term memory. It is believed that a combination between working memory and long term memory properties and functions, would considerably contribute to a better performance. Knowing that working memory is

responsible for momentarily keeping sounds through rehearsal and long term memory semantically handles knowledge for a permanent storage, it is thought that there might be a possibility of making sense of those meaningless sounds in the working memory and internalize them in a way that they would be part of the long term memory system. By doing so, learners would not suffer from an eventual lack of acoustic knowledge (that is basically due to its loss from the system because of moments of inattention or inappropriate rehearsal) since the latter is by now permanently kept in the larger store, i.e, long term memory. .

The respondents' results basically confirmed this. Throughout their answers to the questions, one can understand that, in addition to the undeniable importance of their working memory capacity in the development of their oral proficiencies, EFL learners also make frequent use of their long term memory to keep knowledge related to speech. This has been well highlighted when they tackle the issue held in the section of vocabulary acquisition. In fact, vocabulary items have two aspects: one acoustic when it is pronounced and another one semantic when considered in accordance to its own meaning or even within a sentence. It can be therefore deduced that because of the very special properties of vocabulary, a word could be handled acoustically in working memory (because of its acoustic features) and semantically in long term memory, the thing which allows an enduring storage.

The sum of all that leads us to finally deduce that it is undeniable that working memory capacity plays a vital role in speech production, and hence developing learners' oral proficiencies. Yet, this does not mean that other parts of the human memory system are of less importance. In fact, it is a long process starting from perception, passing by

working memory and ending up in long term memory. Each system functions, and properties contribute to the fulfilment of the remaining systems' functions too.

As a matter of fact, to develop learners' oral proficiencies, teacher should be aware of the details and peculiarities around both the whole memory system (including its characteristics, components and functions), and the speaking skill related theories and approaches. The objective is to come out with a new and more open view of how to deal with learners having learning difficulties (speaking in particular) and different memory capacities, and how to adjust all these to meet the learners' needs inside and outside the classroom.

Perhaps, this is the expected conclusion one should reach by the end of this study, admitting the relevance of the whole memory system in learning in general, and the vital contribution of working memory capacity to develop learners' oral proficiencies in particular. Yet, we are still far away from achieving an ideal interpretation of the concept, and far from pretending to realize and recognize an appropriate methodology to teach EFL learners speaking focusing on just the human memory system functions and features.

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# Appendix

**Questionnaire**

Dear students ;

I am investigating issues related to the role working memory plays in developing the learners' oral proficiency (or the speaking skill). A case study. We believe your contribution to be of great significance to fulfil the objectives of the present study. We assure that the confidentiality of the questionnaire will be kept, and that the contained information will be used only for the author herself.

General information:

-Age: .....

-Male □ , Female □

-How many years have you been studying English at the ENSC

-3 years □

-4 years □

-5 years □

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1- Along your course of study of English as a foreign language, do you think your English has improved?

-Yes □

-No □

2-Whatever may be the answer, could you say why?

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3-In your opinion, which of the four skills you think reflects best your mastery of the English language?

-Writing □

-Speaking □

-Reading □

-Listening □

4-How do you find the Speaking skill compared to the other skills:

-Easy □

-Average □

-Difficult □

5-Do you feel frustrated or unable to orally produce the language in the classroom during the speaking skill session?

-Yes □

-No □

6-In either cases, say why?

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7-In case your answer To item 5 is 'Yes', Do you attribute this to :

A-Lack of linguistic knowledge (lack of vocabulary)

b-The subject being taught is not interesting

c-Some psychological factors like shyness, introversion, inhibition..

d-Others, specify.....

8-What are the media frequently used by your teacher during the speaking session?

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9-Which Medium you think is the best to help you improve/enhance your oral performance? and why?

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10-Does your teacher promote participatory techniques in teaching English?

a- Yes □

b-No □

11- Does this help you acquire, and then keep new English words in your minds to be used when necessary?

a- Yes □

b-No □

12-What does your teacher do to teach you new vocabulary?

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13- Does your teacher use some techniques relying on memorization to help you to effectively learn new vocabulary?

a-Yes □

b- No □

14-What are your own techniques to keep the newly learnt vocabulary in your mind.

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15-Are you able to remember the learnt vocabulary after a given period of its acquisition?

a- Yes □

b-No □

16- If yes, explain why?

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17- If no, state the reasons behind your forgetting. ?

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18- How do you do to keep knowledge about the learnt vocabulary in your mind?

a) Create mental association
b) Apply images and sounds
c) Reviewing well
d) Employing actions
e) Analysing or reasoning
f) Creating structures for input and output
g) Arranging and planning your vocabulary
h) Evaluating your vocabulary acquisition
i) Lowering your anxiety
j) Encouraging your self
k) Interacting with others
l) Empathising with others

19-As an English learner, do you think that memory can play an important role in developing one's oral proficiency? Express yourself?

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## List of non-words repeated during the experimentation

Read the following words silently

-Tharg

2-Pharg

3-Embeddlement

4-Daughder

5-Regundancy

6-Dravery

7-Klowledge

8-Lostage

9-Quemerang

10-Redolution

11-Blever

12-Awale

13-Carloon

14-astronoby

## Résumé

L'objectif de cette recherche est de mettre l'accent sur la relation entre l'acquisition du langage et le système de la mémoire humaine et l'éventuelle contribution des différentes parties de cette dernière ( la mémoire à court terme en particulier) dans le développement de la compétence orale chez l'apprenant d'une langue étrangère. Pour atteindre ces objectifs, cette recherche est fondée sur une hypothèse qui stipule que si la capacité de la mémoire de travail des apprenants est assez large pour contenir les informations nécessaires, cela permettra la rétention provisoire d'une quantité considérable des connaissances acoustiques, qui à leur tour permettront une bonne production de la parole. Encore, ces connaissances seront internalisées et donc conservées de façon permanente dans un plus grand répertoire, qu'est la mémoire à long terme avec de la pratique est des répétitions assez fréquentes. Pour vérifier la validité de notre hypothèse, nous avons mené une étude expérimentale réalisée sur une population dans le Département d'anglais à l'école Normale Supérieure de Constantine et avons utilisé le test de répétitions de non-mots, généralement utilisé pour mesurer la capacité de la mémoire de travail des apprenants pour démontrer si ces individus sont capables de se rappeler et de reproduire ces sons. Bien évidemment le nombre des non-mots retenu reflète la capacité de la mémoire du travail mesurée. Aussi, nous avons utilisé un questionnaire désigné pour les apprenants qui a pour but l'exposition de la relation entre la mémoire du travail et les fonctions de la mémoire à long terme. Les résultats du test ont révélé que les caractéristiques et les fonctions spécifiques de la mémoire de travail seraient d'une grande importance pour améliorer l'apprentissage de l'aspect oral d'une langue étrangère, confirmant ainsi et validant notre hypothèse. Cette dernière est également confirmée à travers l'analyse du questionnaire ou nous avons senti la totale conscience des apprenants concernant le rôle primordiale que joue la mémoire à court terme dans ce processus. Cependant, nous avons remarqué que cette même population, bien que complètement consciente de cette importance, profondément croit qu'une bonne interaction (communication) est le meilleur moyen pour bien parler et développer une langue étrangère.



**Mots Clés** : Mémoire de travail, compétences orales, apprentissage d'une langue étrangère

## ملخص

تهدف هذه الأطروحة إلى محاولة التعرف على العلاقة الموجودة بين سعة الذاكرة العاملة و إمكانية تطوير المهارات الشفهية عند متعلمي اللغة الإنجليزية. نظريا يهدف هذا البحث إلى تسليط الضوء على التعريف بالمهارات الشفهية و القدرات اللغوية و طريقة تكييفها مع متطلبات متعلم اللغة الإنجليزية عن طريق الإستعمال الدقيق لتقنيات الكلام التواصلية المختلفة، بالإضافة إلى ذلك قمنا بتبيان مختلف مكونات الذاكرة عند الإنسان (خاصة الذاكرة العاملة) من خلال التعريف بوظائف كل مكون و دوره في تسهيل تطوير المهارات الشفهية. من جهة أخرى و لتحقيق الأهداف السالف ذكرها، المبنية على فرضية أنه كلما كانت سعة الذاكرة العاملة أوسع كلما كانت إمكانية الإحتفاظ بكم أكثر من المعلومات الصوتية، الشيء الذي يؤدي إلى تسهيل اكتساب الجانب الشفهي للغة، و عليه فقد تم إخضاع مجموعة من الطلبة، في مرحلة التدرج بقسم اللغة الإنجليزية التابع للمدرسة العليا للأساتذة بقسنطينة، لدراسة تجريبية استعمل فيها اختبار تكرار كلمات بدون معنى في محاولة لقياس سعة الذاكرة العاملة حيث أسفرت نتائجها على تأكيد فرضية البحث. و للتأكد أكثر من تلك النتائج، قمنا بتقديم استبيان للطلبة لدعم النتائج المتحصل عليها قصد إظهار تلك العلاقة الممكنة بين وظائف الذاكرة العاملة، الذاكرة طويلة المدى و تتطوير المهارات الشفهية للطالب، في محاولة لجذب انتباه الأساتذة المعنيين و تشجيعهم على استعمال استراتيجيات تكون على علاقة بالذاكرة لتطوير الكلام، بدلا من التركيز فقط على تقنيات الإتصال و المشاركة في القسم.



**الكلمات المفتاحية:** - الذاكرة العاملة - المهارات الشفهية - تعلم اللغة.