

Unidad Central del Valle del Cauca



**Strategies based on the mnemonics method to influence working memory and English
vocabulary learning in fourth-grade students of the Instituto Tecnico Diversificado
Grajales.**

Carolina Álvarez Rivera

Angie Stefany Ocampo Aguirre

Facultad de Educación

Tuluá, Valle del Cauca

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Strategies based on the mnemonics method to influence working memory and English vocabulary learning in fourth-grade students of the Instituto Tecnico Diversificado Grajales.

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Carolina Álvarez Rivera

Angie Stefany Ocampo Aguirre

Director (a): Claudia Patricia Rivera Sánchez

Tuluá, Valle del Cauca

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Table of contents

Chapter I: Problem statement	3
1.2 Objectives	13
1.2.1 General objective:	13
1.2.2 Specific objectives:	13
1.3 Rationale	14
Chapter II: Reference framework	16
2.1. Backgrounds	16
2.2 Theoretical references	22
2.2.1. Mnemonics	23
2.2.2. Working memory	25
2.2.3. English vocabulary learning	26
2.3. Legal Framework	28
Chapter III: Methodological design	31
3.1 Research Approach	31
3.1.1 Research design	32
3.1.2 Research scope	32
3.1.3 Hypothesis	33
3.1.4 Variables	33
3.2 Population and sample	35
3.3 Ethical considerations	37
3.4 Data collection instruments and techniques	38
3.4.1 Test de Vocabulario en Imagenes Revisado (TEVI - R)	38
3.4.2 Trail Making Test Part B (TMT)	39
3.4.3 Statistical analysis	40
3.4 Implementation process of didactic sequences	41
Chapter IV: Analysis and discussion results	43
4.1 Statistical analyses of the pre-test and post-test comparison of the TEVI R vocabulary test.	43

4.1.2 Normality test TEVI R pre-test and post-test.....	48
4.1.3 Non-parametric test of related samples with Wilcoxon signed-rank test.....	48
4.2 Discussion.....	50
4.3 Conclusions.....	53
4.4 Recommendations.....	55
References.....	56
Anexos.....	62

Index of tables

Table 1. Selection criteria of the population.....	36
Table 2. Control and experimental groups.	37
Table 3. Relation of techniques and instruments.....	40
Table 4. Schedule activities.....	42
Table 5. Statistical analysis of the pre-test and post-test comparison of the variable English Vocabulary learning through the TEVI R test of the experimental group.	44
Table 6. Statistical analysis of the pre-test and post-test comparison of the variable English Vocabulary learning through the TEVI R test of the control group.	45
Table 7. Statistical analysis of the pre-test and post-test comparison of the variable Working Memory through the TMT test of the experimental group.....	46
Table 8. Statistical analysis of the pre-test and post-test comparison of the variable Working Memory through the TMT test of the control group.	47
Table 9. Normality test TEVI R and TMT results.....	48
Table 10. Results of the non-parametric test of related samples with Wilcoxon signed-rank test of the experimental group.....	49
Table 11. Results of the non-parametric test of related samples with Wilcoxon signed-rank test of the control group.	49

Index of figures

Figure 1. Timeline: Bilingual Educational Policies in Colombia.....	4
Figure 2. Levels of Competences in English.....	7
Figure 3 Aptitude level of Colombia in the EF EPI test 2016 – 2021.....	8
Figure 4: Results report of SABER 11 th test.....	9
Figure 5. Results report of SABER 11 th test among educational institutions.....	10
Figure 6. Nonequivalent (Pretest and Posttest) Control-Group Design	36

Abstract

The present research sought to analyze how the implementation of strategies based on the mnemonics method affects working memory and English vocabulary learning in fourth-grade students of the Instituto Tecnico Diversificado Grajales. Through this quantitative, quasi-experimental study, it was evidenced that the population presented little comprehension in terms of English vocabulary after the development of the TEVI R pretest; for that reason, the use and implementation of instruments such as the Trail Making Test (TMT) and the didactic sequences focused on memory processes were determined. From this, the results obtained showed an improvement in the experimental group in terms of working memory and comprehension of English vocabulary; while the control group only obtained an improvement in working memory since the results in the vocabulary test (TEVI R) were not significant.

Keywords:

Mnemonics, memory, working memory, English vocabulary learning, foreign language.

Resumen

La presente investigación buscó analizar cómo la implementación de estrategias basadas en la mnemotecnia incide en la memoria de trabajo y en el aprendizaje de vocabulario en inglés de los estudiantes de cuarto grado del Instituto Técnico Diversificado Grajales. A través de este estudio cuantitativo, cuasiexperimental, se evidenció que la población presentó poca comprensión en cuanto al vocabulario en inglés al desarrollar el TEVI R pretest; por esta razón, se determinó el uso e implementación de instrumentos como el Trail Making Test (TMT) y las secuencias didácticas direccionadas en procesos memorísticos. A partir de ello, los resultados obtenidos mostraron un mejoramiento en el grupo experimental en cuanto a la memoria de trabajo y comprensión de vocabulario en inglés; mientras que el grupo control únicamente obtuvo mejora en la memoria de trabajo ya que los resultados en el test de vocabulario no fueron significativos.

Palabras clave:

Mnemotecnia, memoria, memoria de trabajo, aprendizaje de vocabulario en inglés, lengua extranjera.

Introduction

During the last years, Colombia has made an important commitment to implementing English in the educational institutions of the country, due to this language is becoming more and more predominant, both in the social and work environments, since nowadays the possibilities for cultural interaction are greater and the globalized world requires to be fluent in at least two languages to achieve a good communicative process. Therefore, it is expected that the main objective of good English language development in the classroom is to help the students in elementary and higher education to acquire the necessary skills to perform in academic activities and to be able to use them in real-life situations.

However, it is necessary to mention that Colombia has not obtained good results in national and international tests such as SABER, TOEFL, EF Education First and IELTS that indicate the English level of students. Therefore, it is important to implement many aspects in the classroom in order to improve the English skills of Colombian people; in this sense, to achieve a good communicative competence is required to have a wide vocabulary as Moreno (2013) mentioned through Garcia (2009):

"Vocabulary is a key element in language learning since it is supposed to be the basis of communication itself; it is not only possible to think with words, but words allow communicate and express thoughts, feelings, and desires". (p. 114).

Thus, in addition to providing knowledge in terms of grammatical bases and vocabulary, it is necessary to stimulate thought processes that contribute to language learning, since memory

and learning are directly related; learning refers to the fact of obtaining skills or information, and memory refers to the production of what has been obtained. (V. Vijayalakshmi & S. Patchainayagi, 2020).

For this reason, analyzing the above, the proposal arises to implement neuropsychological processes such as mnemonic strategies and the development of working memory to contribute to the improvement of English vocabulary in the selected population.

Chapter I: Problem statement

English teaching and learning have become one of the main pillars of Colombian schooling since, in addition to contributing to the growth of the education system of this country, according to the criteria of standardized measurements, it allows access to job opportunities, to develop social skills and cultural exchange (Bryam, et al. 2002) due to the English use as a global communication language. For the above, it is important to recognize that the research, “How the implementation of strategies based on mnemonics method affects working memory and English vocabulary learning” intends to make a study about neuropsychological processes such as working memory and learning vocabulary for the improvement of English vocabulary using the mnemonic method, in order to obtain improvements in the communication of the students and also, to contribute with the interest of the same towards the English as a foreign language.

To promote the learning of English as a foreign language in Colombia has been created diverse policies through the years which benefit the design of strategies and dynamics that encourage the development of communicative competence (See figure No. 1). However, teaching and learning English as a foreign language in Colombia has been considered a challenge because despite there are documents, objectives, and criteria for language learning they are not related to theories and backgrounds about English communicative competence (Parra, et al. 2012); likewise, there is a lack of implementation of strategies, methods, methodologies, and approaches that allow the development of communicative competence.

Even, in some educational contexts such as public schools, the teachers are not prepared to teach English or to use strategies that facilitate a good appropriation of the topics. Thus, the lack of pedagogical planning generates monotony that negatively influences learning (Gamboa,

Garcia, and Beltran, 2013). Consequently, it is recognized that in order to enrich the teaching process it is necessary for teachers to be trained and to have experience in teaching English as a foreign language; for that, Mahmoud and Al-Zoubi (2018) mention “Inside the classroom, one of the most central roles of the teacher is to provide learners with sufficient exposure to practice the target language in a variety of contexts, and from different speakers”. (p.152)

Taking into account the aforementioned, it is concluded that in order to achieve a good development of the English foreign language in Colombia, it is necessary to start with the process of adaptation of skilled teachers in the area, who in addition to teaching grammatical rules have the ability to contextualize their students and make them an approach to the culture, allowing them to know the slangs, customs and everything that makes them feel immersed in the process; with this, students will feel motivated and will begin to have high expectations with the learning of this foreign language, having there the pertinent opportunity to strengthen and improve in this field.

Figure 1. Timeline: Bilingual Educational Policies in Colombia

	Law March 16th	Extinction of Latin in schools	Visit of Colombian's president to France	British Council's report	Colombia's new political constitution	General Law of Education	Ending of COFE Project	National Bilingualism Programme	Bilingualism Law	Colombia Very Well	Colombia Bilingüe
Timeline:	1826	1970	1979	1989	1991	1994	1997	2004	2013	2014	2015
	Compulsory subjects across all national public schools Spanish, Latin, Greek, French, English and an indigenous language, the one with most speakers depending on the region where the school was located.	Ending decade for latin as a subject in Colombian schools.	Decision to adopt French as a compulsory subject for secondary school (Grades 10 and 11)	A survey of English Language Teaching and Learning in Colombia: A Guide to the Market.	Open political recognition of all indigenous languages, and of the Colombian's multilingual and cultural richness.	Ley 115 de Febrero 8 de 1994. Por la cual se expide la ley general de educación, broadly states the acquisition of conversation and reading elements at least in a foreign language as a desirable goal.	Licenciaturas were modified thanks to the initiative but no major charges were perceived in national students' proficiency.	Programa Nacional de Bilingüismo. Colombia 2004 - 2019. Inglés como lengua extranjera: Una estrategia para la competitividad. Intended to last up to 2019. First inclusion of the Common European Framework.	Various articles from the previous General Education Law in 1994 were modified to reflect the horizon of English as a technical tool for employment.	Programa Nacional de Inglés Colombia Very Well 2015 - 2025. 1.3 billion Colombian pesos for ten years in a flagship endeavour.	Some traits of CVW are kept (textbook materials such as English please, and the Common European Framework) but ample and dear information of its overall scope and strategies for implementation have not been released.

Note. This figure shows the description concentrating on the phases for policies in bilingualism spanning 2001 through 2006. Bonilla and Tejada (2015) Unanswered Questions in Colombia's Foreign Language Education Policy, pp. 03.

According to the graph, it is appropriate to understand that the policies have been consolidated as a fundamental basis of English as a foreign language to contribute to the improvement of communicative skills. Hence, the Ministry of National Education (Mineducación) suggests programs and regulations to allow citizens to be competitive in a foreign language and contribute to an education with higher quality criteria. Due to, it enables to generate opportunities for; progress, the development of the society, the interaction and communication with others and other cultures (UNESCO, 2013)

In 1994 was created the law 115 in which are established aspects, criteria, and general rules that regulate the education process, here Mineducación proposes the importance of learning a foreign language in order to students can be able to strengthen their integral development. It is relevant to mention that, based on that law, Mineducación has created and proposed programs and projects to carry out the English teaching and learning process in Colombia; one of them is the Programa Nacional del Bilingüismo (2004) which sought that citizens could be able to acquire competence of a foreign language, as well as, the creation of strategies that contribute to the communicative skills (MinEducación, 2006)

Subsequently, Programa Nacional de Inglés 2015-2022 “Colombia Very Well”, was implemented with the aim to strengthen English teaching processes in elementary and middle school education, in which English teachers from the official sector represent an essential part of the program implementation and provide a comprehensive, cross-sectoral and long-term strategy that enables students to use English as a tool to communicate with the world and improve their opportunities (Ministerio de Educación, 2015) To respect, El Universal (2014) mentions that the main objective of this program is related to the quality of higher education because it seeks to increase from 55.000 to 140.000 students who must graduate with an upper-intermediate English

level (B1) according to Common European Framework of Reference (2002), to propose strategies for monitoring and promoting an education with higher quality criteria.

In the same way, as it is pretended to have an education with high-quality standards, in Colombia it is important to improve the results obtained in the national and international tests used to measure the foreign language skills of students. In this order, the Mineducacion presents in the Guide No. 22 that: “the English standards constitute a fundamental orientation for English teachers, directors, and parents to have clarity about the communicative competences that children at Basic and Intermediate levels are expected to develop, in order to help them achieve the goal set out in the Document Vision Colombia 2019. (2006; p. 2)”. Accordingly, the national government is committed to training Colombians to be able to communicate in another language, since having a good level of English not only facilitates employment and educational opportunities but it also promotes life quality to citizens can be competent in the globalized world.

Likewise, this guide defines the standards of the National Bilingualism Program which constitutes clear and public criteria for establishing the basic standards of quality to which children and young adults in all regions of Colombia are entitled (MEN, 2020) to expose the educational community what students must learn and the competences they might develop with the knowledge they acquire during a certain level. The Basic Proficiency Standards in English are framed in the labor Mineducacion, has done for the development of English as a Foreign Language, that have been standardized the students must acquire the language competence depending on the grade they are in. It is for that, “Guia 22” sets different skills such as oral, written, listening, and reading standards for each grade level, based on the Common European Framework of Reference (Council of Europe, 2002)

In this sense, the Mineducacion embraces this benchmark to base and puts a specific level of English language in order that students of 11th grade reach an intermediate level (B1), and in this same way, it proposes levels for each group of grades. In accordance with, in 2019 all students should have achieved an A1 level at the end of third grade, an A2 level at the end of seventh grade, and a B1 level by the time they graduated. (Mineducacion, 2006, p. 10). Through the levels defined by CEFR it is possible to corroborate students' progress and the articulation achievements in accordance with what pupils need to know; that is to say, provides evaluators and institutions the assurance that students have reached the required standard.

Figure 2. Levels of Competences in English

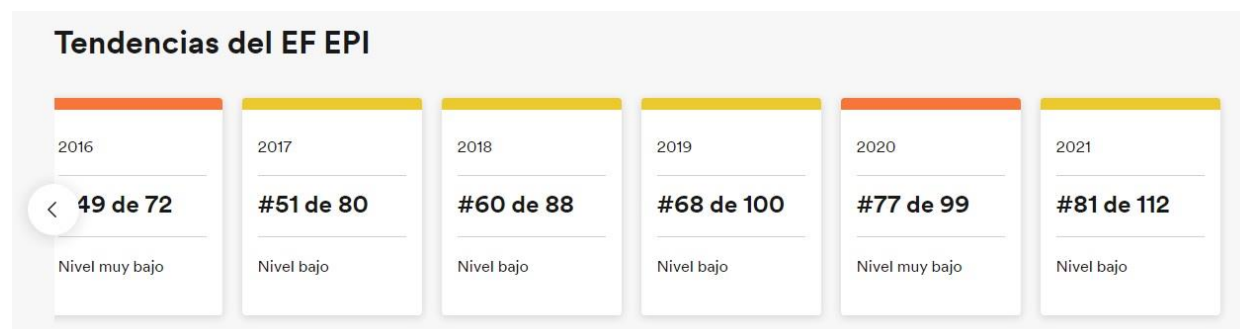
GRUPOS DE GRADOS	NIVELES MCE		
Décimo a Undécimo	B1	B 1.2	Pre intermedio 2
Octavo a Noveno		B 1.1	Pre intermedio 1
Sexto a Séptimo	A2	A 2.2	Básico 2
Cuarto a Quinto		A 2.1	Básico 1
Primero a Tercero	A1	A1	Principiante

Note. This graph shows the description of English levels according to the CEFR (Guia 22, 2006)

However, the results of international and national tests such as EF Education First, TOEFL, IELTS, and SABER have shown that teachers and students have a low level of English according to the criteria proposed by the Mineducacion and CEFR. According to the EF test, Colombia is located between low and too low levels of English (See figure No. 3), which could mean that there is a low level of the linguistic competencies development (Sanchez, 2013) and also, it can demonstrate that there are a lot of weaknesses and needs in the teaching process because it is necessary that teachers be competent in the language, develop methodologies and dynamics

appropriate to the English teaching, use materials, strategies and resources that enable to students to engage to their culture and understand that English is a communication media (Roldan, 2016)

Figure 3 Aptitude level of Colombia in the EF EPI test 2016 – 2021



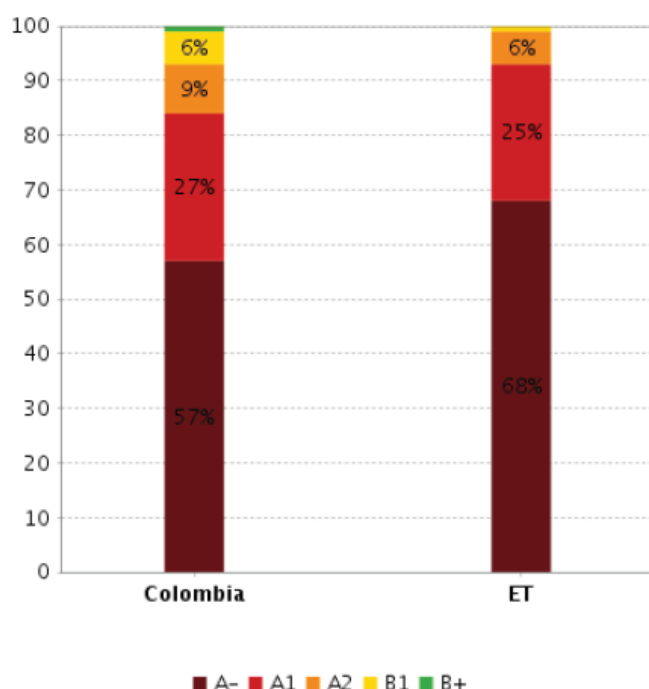
Note. This graph shows the aptitude level of Colombia in the test EF EPI 2016 – 2021

The results obtained in the national and international tests could be disadvantages in the society development owing to, they expose that there are not significant changes in the English teaching and learning processes (Sanchez, 2013) because students and teachers have not reached the established English levels proposed by the Mineducacion. This is unfortunate for all students who want to perform in the future, not only in an international surrounding but also in an intellectual and working area. Furthermore, it will be a challenge for all Colombian educational institutions and English teachers as a foreign language to overcome those low levels of student achievement and to generate possibilities for performance, action, and production in the classroom using real-life situations and solving problems.

Based on the report made by El Tiempo journal (2020), it is possible to recognize that educational institutions in Colombia generally struggle with state tests on the ground that some researchers discovered that the average national score of the 567,000 students who took the tests in 2019 was 248, less than half of all possible points on the exam 500. It is reflected in the test

results of “Instituto Colombiano para la Evaluación de la Educación” (ICFES) which report the comparisons among groups data on private, rural, and urban official TE establishments and the territorial entity (TE) belonging to Valle del Cauca zone in Colombia.

Figure 4: Results report of SABER 11th test.

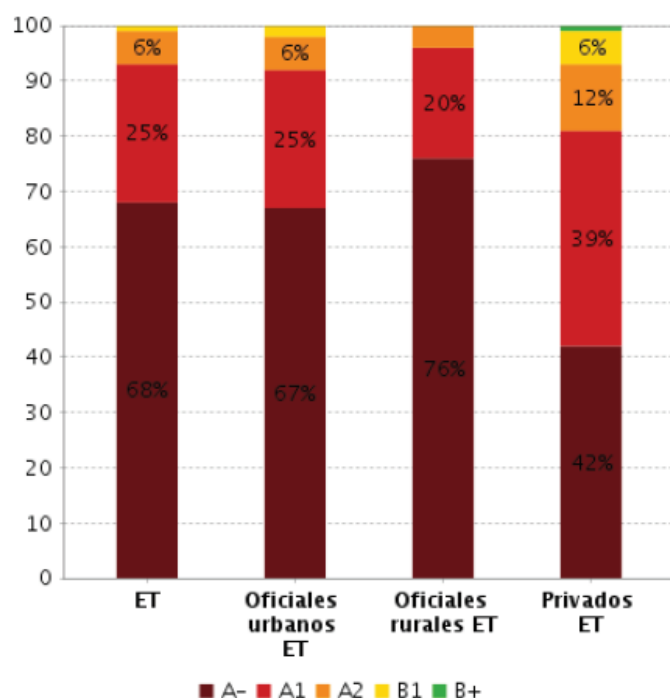


Note. The figure reflects the report on the results of the 11th grade exam by application, Territorial entities, secretary of education. (ICFES, 2021)

Regarding those results, it could be analyzed the ideal scenario is one in which the green and yellow segments occupy most of the bar. Here, a specific comparison is made for the territorial entity that refers to Valle del Cauca over Colombia; that is to say, Colombia presents 57% with A- and the department of Valle del Cauca even more than half with A- at 68%. Thence, those levels respond to the fact that, in Colombia, exist a population under the first level of the CEFR (A1), which led to including in this module a level lower than A1, called A-, representing those

minimum requirements that imply the use of vocabulary and basic grammatical structures. Likewise, a level higher than B1 is included for those students who exceed what is assessed at this level, called B+.

Figure 5. Results report of SABER 11th test among educational institutions.



Note. This graph enables to recognize the report on the results of the 11th grade exam by application, Territorial entities, secretary of education. (ICFES, 2021).

In this graph it is evident that 68% with A- results are obtained in Valle del Cauca, followed by 67% with A- in official urban institutions, 76% with A- in official rural institutions, and finally almost half of the percentage in private institutions with a total of 42% with A-. This is an emergency not only for the educational institutions but also the government in order to take measures to help students to strengthen their level of comprehension and production in a foreign language such as English.

In this sense, this project sought to contribute to the implementation of strategies based on mnemonics for the analysis, and contrast of working memory in learning English as a foreign language. Due to, through the pretest, the researchers realized that the students needed to know new vocabulary and achieve understanding grammatical structures, hence, a traditional method is not selected, but instead, a method based on neuropsychology in order to work from the brain processes of students. This method is pertinent to improving English vocabulary since, neuropsychology could be known as a scientific study where the relationship between brain function and behavior is studied Kreutzer, J. S., DeLuca, J., and Caplan, B. (2011) because it allows understanding how the brain works, how thought is developed, the language production and its influence in the mental processes and behavior.

Baddeley and Hitch (1974) think that working memory plays an important role in supporting a whole range of complex everyday cognitive activities including: reasoning language comprehension, long-term learning, and mental arithmetic. Regarding the above, this study facilitates the design and implementation of strategies that support the development of working memory at an early age in terms of the academic context, thence, it is possible to generate positive changes in the working memory of the students and they can acquire English vocabulary through the constant and directed work guide by the teachers. In this way, it should be understood that “the heart of language comprehension and use is the vocabulary” (Hunt and Beglar, 2005, p.2) therefore, neuropsychology with education will contribute positively to vocabulary acquisition because they stimulate thought processes.

Considering this study sought to promote vocabulary acquisition, the population selected is Instituto Tecnico Diversificado Grajales (ITDG) which is a private and urban educational institution located in La Union Valle, that offers education from preschool to high school. Thence,

the fourth-grade students were chosen as the population of this study, who are in A1 level; which means that they do not reach the English standards provided by the government, since according to the levels proposed by Mineducacion, the fourth-grade students must be in A2 English level that allows them to know grammatical structures related to the present and simple past; therefore. In addition to understanding the correct grammatical uses, they must have a wide vocabulary related to different subjects such as daily activities, personal and literary topics logically linked, and sometimes memorized sentences to exchange information related to habits and preferences; moreover, they must produce short text in written verbal form (Mineducacion, 2006).

Undoubtedly, it is evidenced that the fourth-grade group has a low English level owing to, in a first instance, the researchers made an immersive pre-test TEVI R to know the context and the skills that the students have in the English language. Through the mentioned test, it was found that students do not know basic structures to introduce themselves, such as: *My name is, I am... years old, and expressions to ask permission to go to the bathroom*, among others. However, it was perceptible that they do not have much vocabulary in English and the limited vocabulary they know is incorrectly interpreted in their native language. For that reason, working memory was the basis of study to understand and improve the vocabulary expansion and second language comprehension in the learners.

Based on the above, the researchers set out the following research question: How does the implementation of methodological strategies based on mnemonics affect English vocabulary learning and working memory in fourth-grade students at the Instituto Tecnico Diversificado Grajales (ITDG) from La Union - Valle?

1.2 Objectives

1.2.1 General objective:

To analyze how the implementation of strategies based on the mnemonics method affects working memory and English vocabulary learning in fourth-grade students at the Instituto Tecnico Diversificado Grajales (ITDG) from La Union – Valle.

1.2.2 Specific objectives:

1. 1. To identify the English vocabulary level and the working memory development of fourth-grade students at ITDG.
2. To implement strategies based on the mnemonics method in fourth-grade students at the ITDG.
3. To contrast the results obtained after the implementation of the strategies based on the mnemonics method.

1.3 Rationale

Understanding that the main aim of the research was to analyze how the implementation of methodological strategies based on mnemonics influences working memory and English learning vocabulary in the fourth-grade students at the ITDG, the researchers proposed to stimulate working memory as a cognitive component that helps the students to learn vocabulary in English to understand in depth the real situations in the classroom.

The cognitive process involves different skills of the Bloom's Taxonomy such as learning, thinking, reasoning, language use, planning, solving problems, and making decisions (Anderson, L. W., et al, 2001). These abilities influence cognitive functions which include attention, sequencing, processing, and memory processes, that when they are integrated, contribute to the adaptation and understanding of new knowledge used to interpret aspects of the everyday environment. (Shatil, 2013)

In this sense, the functioning cognitive processes were taken into account to understand how students can learn new vocabulary in English by performing specific activities with clear instructions. Baddeley (2010), uses the term *Working memory* to define "the system or systems that are assumed to be necessary in order to keep things in mind while performing complex tasks such as reasoning, comprehension, and learning." (p. 1). In accordance with the present research, the concept of working memory will be taken into consideration under the definition done by this author.

Regarding the above, the intention of this research was to test how much mnemonics could help in vocabulary improvement in fourth-grade students, emphasizing the executive function of working memory, which has the ability to use information held in memory to complete a specific task; that is to say, the function to respond to the planning of daily tasks, manipulation of information over short periods of time and the comprehension of the language processes.

In the same way, the method implemented was Mnemonics. According to Solso (1995; in Amiryousefi & Ketabi, 2011), “Mnemonics are techniques or devices, either verbal or visual in nature, that serve to improve the storage of new information, and the recall of information contained in memory” (p. 179). In other words, it is a bond or association that is established to remember certain things. Through this technique the memory is enhanced, therefore, it is a useful tool to remember new information easily.

It is necessary to mention that the present research aimed to contribute from a quantitative approach, to analyze and show the incidence of mnemonics and working memory as a method for English learning vocabulary, leaving a precedent for the Unidad Central del Valle del Cauca (UCEVA) and for Colombia related to the design and implementation of strategies based on the mnemonic method in the educational field. Likewise, this study is also relevant to other fields of study or other learning contexts related to stimulating thought processes in order to get improvements specifically in the English vocabulary.

Chapter II: Reference framework

Learning English as a foreign language not only promotes the development of communicative and linguistics abilities but also, enables people to develop other competencies and thinking skills related to cognitive, affective, and psychomotor dimensions through the design of strategies and activities that engage and increase the motivation of the students (Casanave et al, 2010; quoted in: Meng-Hua and Chia-Ling, 2021). Therefore, this chapter presents the literature review and positions of different authors which support the aforementioned problem and the variables of this research.

Moreover, it shows the articles and researches that represent the international, national, and local backgrounds about mnemonics, working memory, and English learning vocabulary. Those ten studies were searched in different databases, such as Redalyc, Dialnet, Google Scholar, Scopus, Dimensions, Science Direct, UNIR repository. On the other hand, it is important to mention that the articles were selected considering the relationship that they have with the object of study.

2.1. Backgrounds

Mnemonics is considered a positive method that involves mental and communicative processes to promote language learning. In this sense, the experimental study “Effects of Key-image mnemonics on Chinese instruction for first-grade student’s achievement and interest toward Chinese learning” was carried out by Meng-Hua, Hsueh-Chih and Chia-Ling (2021) with the aim of advancing new methodological approaches by examining the effectiveness of integrating a mnemonic method which Chinese character education. The population was

represented by 6 groups that correspond to 143 first-grade students of Taiwanese elementary school in Ban-Chiao District; the six classes were divided into experimental and comparison groups. Chinese textbooks, Chinese achievement tests, and Chinese learning interest inventory were the resources used to collect the data; as well as ANCOVA and the t-tests were used to analyze the data.

This analysis showed that the experimental group was significantly higher than the comparison group, thence, this demonstrates that the mnemonic method represents a way of enhancing the higher-order thinking skills of students, such as creativity, strengthening memory, and improving the linguistic competence. Even the results allowed to understand that the use of the mnemonic method in educational settings gives possibilities to the students to participate autonomously and actively in language learning. For the above, it is possible to say that the contributions of this study are related to the theoretical aspects, due to it is evidence the use of strategies based on the mnemonic method to promote the acquisition of English vocabulary due to using teaching materials and resources the students can identify and associate vocabulary, develop abilities and build knowledge. Likewise, this study contributes in the methodological criteria for the design, the sample and the instruments to collect data.

Although, there is a lack of researches about the mnemonics, Goñi-Artola and Gonzales (2017) carried out the study called “The effectiveness of the keyword mnemonic in long-term retention of words from a second language” with the aims of making a systematic review of the published results about the effectiveness of the keyword mnemonic in the long-term retention of words from a second language. Thence, databases like CSIC, Web of Science, PsycInfo, ERIC, SCOPUS, and Dialnet were used to bibliography searches and select the studies and articles

taking into account specific terms as criteria (“keyword mnemonic long-term”; “mnemotecnia palabra clave largo plazo” and “mnemotecnia palabra clave demorado”).

As result, this review used 18 experimental studies where it was found that strategies based on the mnemonics method could influence or not in the learning process of a foreign language, considering different factors such as the ages and the learning styles, due to, mnemonics is a method that involves different steps; the keyword is one of those steps in which students use the native language to find words that they can relate in their vocabulary acquisition in a foreign language and allow them to use that vocabulary in their real context to communicate and interact with others. Accordingly, this systematic review provides theoretical concepts related to the mnemonics method which is a variable of this research.

Regarding to the English vocabulary; to determine the influence exerted by the use of memorization in learning English vocabulary in secondary school students, Calcina, N. (2017) carried out the project "Uso del memorismo para el aprendizaje del vocabulario del ingles en los estudiantes del 1° grado de la institucion educativa industrial Muñani de Azangaro". The population was 84 students aged 11 to 12 in the first grade of secondary school. It is experimental research with a pre-experimental design supported by quantitative techniques like T-test and qualitative bases such as observation and evaluation.

First, a pre-test was applied to identify the level of the students in their learning; using the results, checklists, written, and oral evaluations were used in 18 sessions to apply strategies based on memory to students can acquire English vocabulary. Finally, the population did a post-test to determine if they acquire English vocabulary. The results analysis provided meaningful data about the English vocabulary because it showed that students increased the results in the post-

test through the use of the memory method. Therefore, it is concluded that this project contributes to the theoretical framework since, it demonstrated that the use of strategies, activities, dynamics and resources where memory is involved enables to the students acquire or increase their English vocabulary and use it to communicate in different real situations that they experience.

On the other hand, Santacruz & Martínez (2018) worked on the study “Can working memory strategies enhance English vocabulary learning?” to determine how working memory training could contribute to retaining vocabulary studied in English lessons through the implementation of a set of memory strategies. This research used a quasi-experimental design and applied pre-test and post-test to measure working memory capacity and to tackle vocabulary learning around different topics. Also, it was used Working Memory strategies to implement lessons for the experimental group to boost the short-term and long-term memory through activities, exercises, and dynamics which allow the students to store information that they are going to use in their daily lives.

To analyze the quantitative data, independent-samples t-tests were employed. The analysis of the obtained results indicated that the WM strategies enhance the English vocabulary learning of the students due to the independent-samples t-tests demonstrating that the experimental group has a significant difference in terms of performance from the control group. For the above, it is possible to mention that strategies based on working memory make that students be able to incorporate and transfer the training they received and enhance their performance in the foreign language. Thus, this study supports the research in the theoretical framework related to working memory as well as in the methodological aspects such as the instruments to analyze the data.

Moreover, “Relacion entre atencion, memoria de trabajo y desempeño en la asignatura de ingles” is another study related to working memory where Mican (2018) intends to recognize the relationship and the impact of working memory on the performance of English as a foreign language (EFL). Through this non-experimental study, Mican (2018) considers that working memory is a process or function developed by the students in their daily lives, where memory works to temporarily store information about activities or tasks at a specific moment. To carry out it, the population was 30 students; 70% of them were 10th-grade students being the focus of the research and the remaining 30% were 11th-grade who were voluntary participants.

| A pre-test and a post-test were applied through the use of the Trail Making Test and Wechsler Intelligence Scale for Children-IV (WISC-IV) to identify aspects related to working memory; and the Key Cambridge test as a tool to recognize the English competence of the students. Likewise, it was implemented a didactic sequence divided into 12 sessions. To analyze the data were used the EZAnalyze program. This analysis showed that there is a significant statistical relationship between Working Memory and English performance. Hence, it is possible to consider that the design and implementation of dynamics, tasks, and activities help students enrich the learning process through their active and autonomous participation, and also, it contributes to the teachers to transform their teaching practice considering the needs that they find in the real educational context. The theoretical aspects, methodological instruments and some arguments contributed to this research.

Rivera, Ramos, Perez, and Salamanca (2020) have written the article “Working memory and verbal learning skills in fourth-grade elementary students” with the objective of analyzing the relationship between working memory and verbal learning skills using instruments such as the Trail Making Test, the Tavecí, and the Academic Average to collect data. This quantitative

research used the Excel program and EZAnalyze 3.0. Thus, were measured 10 quantitative variables where were obtained 24 significant relationships to the high-performance students and 6 of them to the low-performance students.

The data analysis evidenced that high-performance students have the best results than the low-performance students in the variables related to working memory and verbal learning activities due to their median is closer to 15. Consequently, the interrelationships of the variables allow considering that the students with high academic performance are able to do specific tasks using the acquired information and those situations that enable them to solve problems, as well as it is important to recognize that those kinds of students are capable to learn another language and develop the linguistics abilities and communicative competences. From this article, methodological aspects and instruments were considered to support this research.

Finally, “La estimulación de la memoria de trabajo como estrategia para el desarrollo de la habilidad de listening en niños de transición” is a qualitative study carried out by Cortes, Potes, and Rivera (2020) in order to analyze how the stimulation of cognitive processes affect the learning of a foreign language considering the working memory as a cognitive aspect in the language development and understanding. In this action research were applied Trail Making Test (TMT) and the Cambridge pre-starters A-1 test as diagnostic of the working memory and English listening skill to design and implemented methodological strategies and activities focused on the working memory stimulation of twenty-two preschool students of a public school. Alike, the competencies of working memory were used to establish the analysis categories of journals that were used to collect and analyze data.

Regarding working memory and listening abilities, the data of this research allow understanding that it is possible to strengthen the working memory development in preschool students since, through the activities design; and autonomous, creative, and directed work teachers can get positive changes in the teaching and learning processes since working memory is considered to be a cognitive aspect it could encourage the language development of students through their perceptions, knowledge and the mental representations that they build about how they perceive the world. Even, working memory can promote good development of English listening skills when the students relate the information to their behavior and the way that they react in different situations because in this case, working memory is considered as a dynamic process in which the students can do cognitive tasks, learn and understand a new language (Baddeley et al, 2012; quoted in: Cortes, Potes and Rivera, 2020).

Those backgrounds were considered pertinent in order to support this research in theoretical and methodological aspects. Since it was considered the perspectives of authors about Mnemonics, Working Memory, and English Vocabulary Learning. Alike, there is a relationship among the approach, design, techniques, and instruments. Moreover, it is important to mention that two of them had the instruments TMT which was relevant and implemented in this study as well, to collect the data.

2.2 Theoretical references

English learning is a process that contributes significantly to the cognitive, social, emotional, psychological, and cultural development of people since it not only promotes the development of communicative competences and linguistic abilities but also fosters the strengthening of cognitive processes and skills that facilitate the comprehension and appropriation of concepts, knowledge,

and perceptions in different daily situations. Therefore, teachers should design and implement resources, strategies, and activities that involve memory and thinking skills to enable the acquisition of vocabulary, comprehension, and interpretation of texts, interaction, and communication through the use of the language learned.

2.2.1. Mnemonics

It is necessary to understand that mental processes and cognitive skills play an important role in the learning of a foreign language since, through the relationship of these, it is possible to boost the development of linguistic and communicative abilities (Aguado, 2001; Cassany, Luna, and Sanz, 2003). In the same way, it is relevant to highlight that memory is a process that involves the storage of information, as Saul McLeod (2013) mentions, “memory is involved in processing vast amounts of information. This information takes many different forms, e.g. images, sounds or meaning” (p.1). Furthermore, there are three memory systems that communicate and relate to each other: sensory memory (SM), short-term memory (STM), and long-term memory (LTM). These systems are successive in the processing of information that, when it reaches long-term memory, can be retrieved. (Kundera, 2010).

From this view, it is relevant to recognize that mnemonics is a technique that helps to facilitate the memorization of specific data and is mainly based on linking, associating, and articulating the information to be retained. Calcina, N. (2017) mentions that mnemonics are learning through memory, or memorization, which is fundamental to learning a new language due to, it is used as a strategy that helps students to use the prior knowledge and the context to learn and acquire new vocabulary. Hence, teachers could create, design, and implement different activities that involve the use of the Mnemonics method to enable the students to develop their

low and higher-order thinking skills because Bakken (2017) considers that they are strategies that could be beneficial “for students with intellectual and developmental disabilities” (p.1) since it enhances meaningfully the learning and cognitive processes and the use of new vocabulary in the real context of the students.

However, Putnam (2015) thinks that “mnemonics only encourage rote memorization and do not help with higher-order skills, such as comprehension or the transfer of knowledge” (p.4) due to students are not able to appropriate and build knowledge taking into account the vocabulary that they are acquiring. Accordingly, Meng-Hua and Chia-Ling (2021) argue that mnemonics foster knowledge construction and creation rather than knowledge acquiring and retrieving since the visualization of images is considered an effective strategy that contributes to creativity and the rapid learning of visually similar characters. Hence, it is relevant to recognize that the use of strategies based on the mnemonic method promotes English Vocabulary Learning owing to, using materials and resources in the teaching and learning processes, the students could be able to easily identify, associate, and store information to build new knowledge and develop some abilities and competencies (Aguado, 2001; Cassany, Luna, and Sanz, 2003). (Cassany, D., Luna, M., & Sanz, G, 1994)

Pictures, sounds, and other audiovisual aids are effective to employ the mnemonics method in English vocabulary learning because the students can remember easily connecting those resources with the prior knowledge and the way that they perceive the context. Therefore, mnemonics are relevant and effective strategies that allow understanding of the learning process of the students and how the teacher can motivate the students, make the class more interesting and contribute to their cognitive and integral development of the students (Baddeley, 1974; Weill, 2011; Cortes, Potes and Rivera, 2020).

2.2.2. Working memory

In the understanding of a foreign language, there is a close relationship between learning and memory that contributes to the effective strengthening of the language learning and the development of abilities (Rodríguez, 2013) since they are cognitive psychological processes that influence the acquisition and linguistic use of English language. Memory can develop skills in language learning, allowing the student to communicate, enrich social relationships and adapt to outside contexts. Therefore, working memory refers to the structures and processes used to store information in short periods of time. Lazar (2017) suggests that is a mental process in which information is maintained and manipulated during the execution of ongoing tasks and activities. That is to say that in the temporary storage (short-term memory) also occurs manipulation of information in complex and simultaneous tasks since is a system that allows the processing of information coming from sensorial input.

Nevertheless, the concept of working memory was initially discussed by Baddeley and Hitch (1974) who present a model where they define working memory as a system to store temporarily information as it is processed. Baddeley (2000) made a reformulation fragmenting working memory into three distinct subcomponents; *The Central Executive*: through cognitive tasks involving working memory are carried out, performing control operations and strategy selection. *Phonological Loop*: which is a system for storing information according to the sound (internal speech) associated with words, keeping the information in the consciousness for the desired time. *Visuospatial Sketchpad*: System whose purpose is to create and manipulate visuospatial images.

Regarding it, Adams, Nguyen & Cowan (2018) mention that “the limits of working memory are such that there are many points at which this hybrid process can go awry because multiple skills compete for a limited working memory capacity” (p. 340). As is well known, working

memory is characterized by having a limited capacity for information that can be temporarily maintained in an accessible state, which makes it useful for many cognitive tasks such as language comprehension, reasoning, reading, problem-solving, etc. And this limitation can be addressed, for example, if the learner under normal conditions is performing some tasks that require repetition of new information in what Baddeley (2007) calls a "phonological loop". This repetition allows the information to be integrated into long-term memory.

On the other hand, Barrouillet and Gaillard (2011) assume the content of working memory as long-term memory traces where the brain works in an activated way and represents current information that requires attention and is used to maintain and process in a focused way the relevant information to the task that is being developed. Indeed, one of the main limitations of cognitive functioning is the limited capacity of working memory. For instance, the low performance of young children in cognitive tasks is largely due to a limited capacity of working memory, whose increase is age-related and is one of the main factors in cognitive development. Consequently, working memory is the system dedicated to the active maintenance of information while it is in progress.

2.2.3. English vocabulary learning

Considering that Mnemonics strategies are implemented to contribute to the memorization of specific data, vocabulary learning is an important process in the language acquisition, due to as Oster (2009) states, having a large vocabulary is indispensable for the comprehension of a foreign language, and vocabulary learning is related to three types of knowledge: semantic (the meaning of the word itself), form (phonetic and morphological aspects) and usage (grammatical functions). Alike, Harmer (2007) describes that grammar, vocabulary, and pronunciation are three very

important elements of a language that are developed during learning and that at least the learner knows: grammar, vocabulary, and pronunciation. Thence, it is relevant to know that it is not only about knowing the vocabulary but also about understanding the written form, the sounds, the oral production, and the contexts in which can be used to get familiarized.

Even, Celce-Murcia, (2001) establishes that “vocabulary learning is central to language acquisition, whether the language is first, second, or foreign”. Although in the same fragment it is mentioned that “vocabulary has not always been recognized as a priority in language teaching” (p. 285). Thus, there is a contrast between the perspective of vocabulary learning considered a priority and the perspective as an irrelevant part of learning a foreign language; however, it is recognized that the importance of this aspect increases when grammatical structures are already known since without a broad vocabulary it is impossible to achieve a good development of English foreign language skills.

Consequently, Wang, Teng, & H, (2015) argue that communication can make more fluently and exact having enough vocabulary since it allows people to transmit clear ideas by improving their listening, speaking, reading, and writing skills. Although, Brown (2000) considers that purely vocabulary learning is a major limitation that can present obstacles for learners because they become blocked when they encounter an unfamiliar word. Nevertheless, vocabulary learning is considered “central to English language teaching because without sufficient vocabulary students cannot understand others or express their own ideas” (Elyas, T., & Alfaki, I, 2014, p.). This perspective reinforces the relevance of vocabulary in the process of learning a foreign language.

Considering the different perspectives, it is understood that the learning of vocabulary in English is one of the main aspects to contribute to a correct appropriation of the language; denoting

a close relationship between the memoristic ways of learning and the strategies used to acquire vocabulary.

2.3. Legal Framework

Regarding the regulations and taking into account that article 67 of the Political Constitution (1991) establishes "education as a public service and a right of all people to training in respect for human rights, peace and democracy with the purpose of contributing to cultural, scientific and technological improvement and environmental protection" (p. 11); this research proposal is based on the General Law of Education Law 115 of 1994, Decree 1075 of May 26, 2015, or Sole Regulatory Decree, Resolution 2343 of 1996, the National Bilingualism Plan in which the Basic Learning Rights are established, and other pedagogical guidelines, the Guide No. 22 where the Basic English Competency Standards are found, Law, 1651 of July 12, 2013, Ord. 345 2012 March 16 Bilingualism Public Policy in Valle del Cauca, and the Common European Framework of Reference (CEFR).

This compilation of laws, norms, articles, and criteria that underlies this research study supports the approach to analyze how the implementation of strategies based on the mnemonics method affects working memory and English vocabulary learning in fourth-grade students at the Instituto Tecnico Diversificado Grajales (ITDG) from La Union – Valle.

When the General Law of Education is mentioned, (Law 115 of 1994), it is pertinent to expose that, the Instituto Tecnico Diversificado Grajales is an educational context that offers a formal education through progressive curricular guidelines (Art. 10, 1994). These curricular aspects in which it is included the syllabus must promote teaching and learning of a foreign

language as a fundamental area of study (Art. 23, 1994). Thence, it is proposed that in the educational institutions, teachers must use and create activities, resources, dynamics, strategies, and methodologies that enable students to develop and strengthen their communicative and linguistic skills in foreign languages. Similarly, in article 92 it is proposed that:

Education must favor the full development of the personality of the student, give access to culture, to the attainment of scientific and technical knowledge, and to the formation of ethical, aesthetic, moral, civic, and religious values, which will facilitate the development of a useful activity for the socio-economic development of the country. (p.20)

It is relevant to recognize that the aforementioned aspects could be found in the Decree 1075 of May 26, 2015, which is the Sole Regulatory Decree. Simultaneously, it is important to highlight that Resolution 2343 of 1996 sets out the curricular guidelines and the Basic Competency Standards for English foreign languages. This resolution takes as a reference the Common European Framework of Reference for Languages: Teaching, Learning, and Assessment; it describes what students should learn to do, defines the levels of proficiency, and allows to check the progress of students at each learning level in order to use a language to communicate, as well as the knowledge and skills they have to develop to be able to act and communicate effectively.

On the other hand, it is appropriate to understand that the National Bilingualism Plan (PNB) (Ministerio de Educacion Nacional, 2004) is a strategic project implemented by the Ministry of National Education for the improvement of the teaching of foreign languages and the improvement of educational quality. Therefore, its main objective is to achieve that citizens are able to communicate in English, taking into consideration the mastery of a foreign language and the improvement of the development of communicative competence to solve the needs of society with

respect to English. Likewise, in Article No. 8 of Law 1651 of 2013, the National Government regulates the Bilingualism Law in order to take the necessary measures to comply with the objectives proposed in the National Bilingualism Plan, giving priority to the promotion of the English language.

Alike, it is necessary to mention that, in the department of Valle del Cauca, Ordinance 345 of March 16, 2012, was established, which refers to the public policy of Bilingualism in Valle del Cauca, in order to "improve the communicative competencies in foreign languages of the inhabitants of the department of Valle del Cauca. Given the growing development in industrial, commercial and tourism matters, which, added to its privileged geographical position, generate the need to turn the Department into a bilingual territory" (Gobernacion departamental del Valle del Cauca, 2012, p. 1).

Finally, in the Common European Framework of Reference for Languages, levels are established to define the linguistic and communicative skills and abilities of students in foreign languages.

Chapter III: Methodological design

The following chapter proposes the exploration of the methodology used in this research to answer the research question: How does the implementation of methodological strategies based on mnemonics affect English learning vocabulary and working memory in students of fourth grade (4th) at the Instituto Tecnico Diversificado Grajales (ITDG) from La Union - Valle? This section presents the approach, design, scope, instruments, the population, and the authors that converge in this methodological design, as well as the data collection technique, which is described and analyzed.

3.1 Research Approach

Considering the nature of this research, it is relevant to mention that it is a quantitative study because it is pretended to contrast the data obtained by measuring the variables and through the statistical and descriptive analysis obtaining through the methods and types of tests of the SPSS program V.21. Consequently, Ñaupas et al. (2018) consider that:

In this type of research, the application of the scientific method and specific methods in each of the sciences is rigorous and it is postulated that it is the only way to reach the truth or discover new scientific knowledge (p. 140).

In this sense, through the data analysis it can be determined the significant differences to prove the hypothesis and to identify if the mnemonics strategies can affect working memory and English vocabulary learning in fourth-grade students of the Instituto Tecnico Diversificado Grajales since, the quantitative approach allows to collect and analyze data to validate the

hypothesis by way of the measurement of the variables (Ñaupas et al., 2018) thereby, it is possible to describe the variables.

- **Independent variable:** Mnemonics strategies.
- **Dependent variables:** Working memory and English vocabulary learning.

3.1.1 Research design

Subsequently, the research design possibilities answer the objectives of the study through the plan or strategy conceived to obtain the desired information, for that reason, it is necessary to mention that this research corresponds to a quasi-experimental design owing to seek to contrast the data of the pre-test and post-test to determine the significant difference (Ñaupas et al., 2018). Therefore, through the application of the TEVI R test designed by Max S. Echeverria, Maria Olivia Herrera, Juana Teresa Segure (2015) and Trail Making Test made by W. Halstead y R. Reitan, (1958) it was identified whether the implementation of the mnemonic strategies had a significant incidence in the strengthening of Working Memory and the improvement of English Vocabulary.

Regarding that, activities and dynamics were developed during 8 intervention weeks in the selected population in the Instituto Tecnico Diversificado Grajales. On the contrary, Ñaupas et al. (2018) consider that the quasi-experimental study works with formed groups, thus, the fourth-grade students of the mentioned institution were selected by the researchers as study objects and samples for the research (Campbell and Stanley, 1970).

3.1.2 Research scope

To contrast the cause and effect between the independent and dependent variables it is deduced that the research has an explanatory scope, due to those studies “work with the hypothesis

that explains the effect of the independent variable on the dependent variables” (Ñaupas et al., 2018, p.147). It allows to interpret the relationship among the variables and establish the cause of the phenomenon of this study.

3.1.3 Hypothesis

It is necessary to highlight that the hypotheses allow to start the thinking process articulating theory with practice, and by certain knowledge will be accessed (Ñaupas et al, 2018). Thus, according to the research question an alternative hypothesis (H1) and a null hypothesis (H0) were raised as shown below:

- H1: The target population will show an improvement in their working memory and English vocabulary learning processes after the intervention with the mnemonics method.
- H0: The target population will not show an improvement in their working memory and English vocabulary learning processes after the intervention with the mnemonics method.

3.1.4 Variables

In this section it is important to define what a variable is; firstly, it is defined as a measurable or observable variation in each phenomenon. They are those in which the characteristics or properties can occur in varying degrees, or intensity, have a numerical or quantitative character and are essential units of the hypothesis (Hernandez, et. al 2003). According to the objective of the present research study, it was expected to demonstrate a change in the dependent variable which is "working memory and English vocabulary learning", by means of the independent variable which is the "mnemotechnical method".

- Dependent variable:

As a dependent variable, the following variables were used to measure English learning vocabulary and Working Memory.

Variable 1: English learning vocabulary.

It refers to the learning of vocabulary, which means, all the words that can be found in the foreign language, specifically in English, indeed, vocabulary constitutes a major part of the meaning of any language. This variable is measured with the Test of Vocabulary in Pictures, TEVI-R, which assesses the level of passive vocabulary comprehension that a Spanish-speaking subject between 2 and 17 years of age possesses; in this case, for fourth-grade students an A2 level of vocabulary is measured since it is the established level at which they should be found according to the CEFR.

Variable 2: Working memory.

This ability allows the person to manipulate information in short periods of time in order to perform specific tasks. This variable is measured through a test named Trail Making Test (TMT) It is a visual search speed, attention, mental flexibility, and motor function test. The test consists of two parts, a part A and a second part B of greater complexity. The last one was implemented in the fourth-grade students of the ITDG institution.

As a result, the operationalization of the dependent variable English vocabulary learning and working memory, which is measured by the obtained scores from the respective instrument, is shown below.

- Independent variable:

Variable 3: Mnemonics.

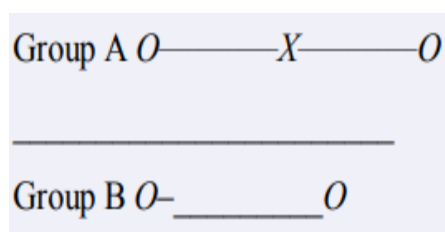
For this study the variable "Mnemonics" was taken as independent, this strategy consists of establishing an association or connection to remember something, a didactic sequence was designed for interventions with fourth-grade students of the Instituto Tecnico Diversificado Grajales.

3.2 Population and sample

The intervened population corresponded to the 30 fourth-grade students of the Instituto Tecnico Diversificado Grajales (ITDG) from La Union - Valle, of which 20 are boys (66%) and 10 are girls (34%). Furthermore, their ages range from 9 (60%) to 10 (40%) years old and they are located among categories 2 (60%) and 3 (40%) of the social stratum. On the other hand, the type of sampling is non-probabilistic for convenience due to Creswell (2014) considers that the variables must be identified in natural situations where the same instrument can be applied to both groups, the control and experimental group; alike, he proposed that the intervention must be implemented to the control group to know if it affects or not (See figure No.6). For that reason,

the fourth grade was divided into two groups and the students were chosen according to the criteria determined in order to reduce the variables that could affect the results of the intervention. They are exposed in table No. 1 and they were considered according to the study "Video Juegos Y Comprension Del Vocabulario De Una Lengua Extranjera (Ingles) En Estudiantes De Grado Quinto De Primaria" that supported the theoretical framework of this research.

Figure 6. Nonequivalent (Pretest and Posttest) Control-Group Design



Source: Creswell (2014). *Research design: Qualitative, quantitative, and mixed methods approach* (p.220).

Table 1. Selection criteria of the population.

Selection criteria.
<ol style="list-style-type: none"> 1. Belong to the same grade and institution 2. Have similar cognitive levels 3. Have similar ages 4. Have a socioeconomic stratum 5. Do not take extra English lessons 6. They are not from foreign countries with English as the native language

Note. This table evidences the selection criteria used to choose the population.

Considering the sample, the group were divided into two groups to make up the control and experimental groups in order to contrast the results after analyzing the data (See table No. 2)

Table 2. Control and experimental groups.

Population		
Grade	Group	Participants
4 th	Experimental	15
	Control	15
Total		30

Note. Distribution of the population in control and experimental groups.

3.3 Ethical considerations

On the other hand, regarding the ethical protection and confidentiality of the participants, data and information provided for the study, the study is conducted anonymously, i.e. without providing and/or requesting the name of the participants, in order to protect personal information (Law 1581, 2012). Therefore, the students were given an informed consent form that had to be signed by the parent.

The consent form must be signed by the parent or guardian, and by the student him/herself, showing all the information regarding the research and the parameters that protect the participant's identity (see Annex 1).

3.4 Data collection instruments and techniques

This section presents the selection of the research instruments and techniques that guaranteed the validity of the research results. Thus, it is relevant to say that, the researchers need to use appropriate instruments in order to the information obtained could be considered valid. Hence, it is necessary to use reliable instruments which must be valid to demonstrate an effective measure of what the researcher intends to quantify to answer any inquiry. (ICFES, 1999)

Accordingly, those selected instruments are of quantitative nature, therefore they were used to collect data and do statistical and descriptive analysis that allows to recognize the influence of the variables, represent the impact on the population and verify the hypothesis to set conclusions about the research process. The instruments and techniques used were:

3.4.1 Test de Vocabulario en Imagenes Revisado (TEVI - R)

This standardized test is a questionnaire of vocabulary in images, and it was designed by Echeverria, Herrera, and Segure (2015) to evaluate the level of passive vocabulary comprehension of Spanish native speakers between two years to seventeen years of age. Also, it attempts to measure the comprehension that a student has of the graphic representation shown or that has been verbally stated by the examiner, hence the student must select an image that corresponds to the term expressed in the multiple choices. With the results, this instrument makes it possible to know the position of the learner in relation to his or her peers regarding to vocabulary comprehension, thus detecting possible delays at this linguistic level, which facilitates an adequate and timely remedial intervention.

The instrument is made of thirty-five questions related to general vocabulary to determine the English vocabulary of the students. This instrument was implemented in one of the researches that were relevant to the theoretical framework, and it is called "Video Juegos Y Comprension Del Vocabulario De Una Lengua Extranjera (Ingles) En Estudiantes De Grado Quinto De Primaria".

3.4.2 Trail Making Test Part B (TMT)

The test is used to assess attention, flexibility of thought, and visuospatial ability. It consists of linking numbers and letters through lines. They are linked following the sequence of numbers and letters; for example, 1 with A, 2 with B, and so on. In context, it was carried out with fourth-grade students of the ITDG institution, virtual and face-to-face groups were used since crowds are not allowed in classrooms due to covid-19. Each student was evaluated individually, and the instructions of the test were explained in detail, if the student completed the practice test without any difficulty they continued to the test. Otherwise, they were corrected until the student understood the order without mistakes, and the test has twelve numbers in total and goes up to the letter L, the time was measured and was applied to 31 students in 3 class meetings.

Previously, this instrument was used in the local researches “Memoria de trabajo y habilidades de aprendizaje verbal”, “La estimulación de la memoria de trabajo como estrategia” and also, it was implemented in the national background “Relación entre atención, memoria de trabajo y desempeño en la asignatura de inglés”

3.4.3 Statistical analysis

After the data were systematized, the SPSS (Statistical Package for Social Sciences) program was used in order to the researchers can access to information that allowed them to determine hypotheses quickly, and to perform measures of central tendency, variability, and dispersion for the quantitative variables that were carried out in the study and enabled the descriptive analysis. Finally, assumptions of normality, homoscedasticity, and nonparametric tests of statistical descriptive data and the (T student) test for related and independent samples were considered.

Table 3. Relation of techniques and instruments

Techniques	Data collection instruments	Resources	Specific objectives	Analysis of results
Pretest	Test de vocabulario en imagenes (TEVI R) and Trail Making Test - Measuring instrument	Google forms, computer, Google meet	To identify the level of English vocabulary and the development of working memory of fourth-grade students of the Instituto Tecnico Diversificado Grajales through the TEVI-R and TMT tests.	The TEVI-R vocabulary test is made up of 35 multiple choice questions related to the understanding of the level of the passive vocabulary of fourth-grade students of the ITDG institution. The analysis of the results was carried out through the quantitative approach generated by the descriptive statistics of the SPSS program and the variables which allowed classifying the answers to facilitate the study process.
Implementation	*Didactic unit "Challenging my mind"	Sequence format, mnemonics strategy, flashcards, cards, board, computer, speakers, videos and pictures.	To implement strategies of the mnemonic method based on the didactic unit "Challenging my mind" to promote the development of memory processes and English	The didactic unit based on mnemonics was applied for 8 weeks and designed coherently with the learning objectives. This instrument allows the development of activities involving the students in a meaningful understanding of English as a foreign language.

vocabulary
learning in the
students.

Posttest	Test de vocabulario en imagenes (TEVI R) and Trail Making Test - Measuring instrument	Google forms, computer, Google meet	To contrast the results obtained after the implementation of the strategies based on the mnemonics method.	The analysis of the results was made through quantitative and statistical analysis generated by the descriptive frequencies, the independent samples T-tests, the normality and homogeneity test of the SPSS program and the study variables. This made it possible to classify the responses to facilitate the evaluation process and to respond to the hypotheses proposed.
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Note. Relation of the objectives proposed in the study with the techniques and instruments used.

3.4 Implementation process of didactic sequences

The researchers had the opportunity to design and implement a didactic unit consisting of eight lesson plans based on the mnemonic strategy, which means, the total intervention time was 8 weeks. During the intervention, themes were developed in English such as the months of the year, weekly activities, time, ordinal numbers, songs, listening exercises, and identification of supermarket products, related to the classroom plan of the institution. The unit is composed of planning elements such as learning objectives based on the guides of the Mineducacion, topics, and the description of the activity according to the level of English (MCER).

Furthermore, this didactic unit involves the criteria of the mnemotechnic approach, having relevance to meaningful learning, since it enables the restructuring of prior knowledge, allowing the constructed meanings to be incorporated into the knowledge schemas, modifying, and enriching them. Therefore, the activities presented below seek to promote the good development of the different memory processes of the students and English vocabulary, in order to stimulate their learning processes. Then, the table No. 4 contemplates the planned activities in order to carry out the research; teachers are also invited to include in their classes the different activities.

Table 4. Schedule activities

ACTIVITIES	WEEKS									
	No.1 27 Sep - 1 Nov	No.2 4-8 Oct	No.3 11-15 Oct	No.4 18-22 Oct	No.5 25-29 Oct	No.6 2-5 Nov	No.7 8-12 Nov	No.8 8-12 Nov	No.9 15-19 Nov	No.10 22-26 Nov
Pretest application "Tevi R and TMT"										
Implementation lesson 1 "Weekly activities"										
Implementation lesson 2 "Forming the months"										
Implementation lesson 3 "Ordinal numbers bingo"										
Implementation lesson 4 "Listening special dates"										
Implementation lesson 5 "Parts of the day"										
Implementation lesson 6 "Song"										
Implementation lesson 7 "Dices – Roll it, tell it, cover it"										
Implementation lesson 8 "Shopping at the mall"										
Posttest application "Tevi R and TMT"										

Note. Distribution on the dates on which the didactic unit was implemented "Challenging my mind" (2021)

Chapter IV: Analysis and discussion results

According to the procedure carried out in a series of eight sections based on the implementation of the mnemonics strategies in the experimental group, the alternative hypothesis was tested, which was H1: The target population will show an improvement in their working memory and English vocabulary learning processes after the intervention with the mnemonic method. Thence, in response to the research question posed above, it was possible to analyze that the mnemonic method had a significant impact on the fifteen participants who took part in the research process in the Experimental Group, causing a positive effect on the understanding of the English vocabulary.

4.1 Statistical analyses of the pre-test and post-test comparison of the TEVI R vocabulary test.

After applying the instruments, a data analysis process was carried out with a descriptive and dispersion analysis. Thus, table No. 5 shows the analysis of the variable English vocabulary learning through the TEVI R test. In this sense, the experimental group in the pre-test obtained a mean of 62 which means that they were in a *Great* level; while in the post-test the mean was 74 which refers that the students improved since they went from *Great* to *Excellent* level according to the points established in the note below table No. 3. The median in the pre-test was 60, it is to say that the 50% is above 60 which means a *Great* level and the other 50% is below this level, and in the post-test, the median was 75 which means an *Excellent* level, and in the same way, the 50% is above 75 and the other 50% is below this level. About mode, in the pre-test was 59 and in the post-test 73. The standard deviation of the pre-test was 7,348 and, in the post-test, it was 2,694; they improved by 5 points, it is to say that significant progress was made in

the pre-test and post-test implementation period. Finally, the pre-test had a minimum of 52 and a maximum of 76, and the post-test had a minimum of 69 and a maximum of 80.

The standard values of the test expose whether or not the students obtained significant progress; with the aforementioned analysis, it is understood that there was progress in the experimental group since in the pre-test they were at a *Great* level and through the post-test, they passed to the *Excellent* level; this means that students improved in their vocabulary comprehension according to the level tested.

Table 5. Statistical analysis of the pre-test and post-test comparison of the variable English Vocabulary learning through the TEVI R test of the experimental group.

English vocabulary learning (TEVI R) – Pre-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	62,00	60,00	59	7,348	52	76
English vocabulary learning (TEVI R) – Post-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	74,40	75,00	73	2,694	69	80

Note. Values considered in TEVI R test: >65 points refer to **Excellent** level; from 55 to 65 is **Great** level; from 45 to 54 is **Normal** level; from 35 to 44 is **Low** level, and <35 refers to **Deficient** level.

Regarding the control group in the pre-test they had a mean of 67 which means that they were in an *Excellent* level and in the post-test the mean was 66; this means that although the points decreased, they remain at the *Excellent* level considering the points established in the note below table No. 6. The median in the pre-test was 67, it is to say that the 50% is above this level, which means an *Excellent* level and the other 50% is below 67; while in the post-test, the median was 64 which means a *Great* level, the 50% is above 64 and the other 50% is below this level. According to the mode, the pre-test was 57 and the post-test was 60. The standard deviation of the pre-test was 9.396 and, in the post-test, it was 6.923; they

improved by 3 points but, although the deviation improved, there is still a considerable dispersion of the data. At last, the pre-test had a minimum of 55 and a maximum of 79, and the post-test had a minimum of 56 and a maximum of 78.

The standard values of the test expose that there was progress in the control group since students remained at the *Excellent* level in both the pre-test and post-test; this means that the students maintained their understanding of the vocabulary according to the level tested.

Table 6. Statistical analysis of the pre-test and post-test comparison of the variable English Vocabulary learning through the TEVI R test of the control group.

English vocabulary learning (TEVI R)- Pre-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	67,00	67,00	57 ^b	9,396	55	79

English vocabulary learning (TEVI R) -Post-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	66,07	64,00	60	6,923	56	78

Note. Values considered in TEVI R test: >65 points refer to **Excellent** level; from 55 to 65 is **Great** level; from 45 to 54 is **Normal** level; from 35 to 44 is **Low** level, and <35 refers to **Deficient** level.

4.1.1 Statistical analyses of the pre-test and post-test comparison of the TMT test.

Table No. 7 shows the analysis of the Working Memory variable through the TMT test, considering that the average should be 75 seconds to have a good level of Working Memory; if the result is greater than 3 minutes, it is the Rule of Thumb which means that a neuropsychological intervention is required, and if the result is greater than 273 seconds is equal to a deficient score (See values in the note below table No. 7). According to the last information, the experimental group in the pre-test obtained a mean of 134,20,

which means that they were not in the range of the *Rule of Thumb* but are far from the *Good average* of the test which is 75 seconds; however, in the post-test, the mean was 86,27, which indicates that they had a notable improvement, being closer to the *Good average*. The median in the pre-test was 138,00, it means that the 50% is above this level which shows that the population was closer to the *Rule of Thumb* and the other 50% is below; and in the post-test, the median was 82,00 and in the same way, the 50% is above the level that indicates that the population was closer to a *Good average* and the other 50% is below.

Talking about the mode, in the pre-test was 94 and in the post-test 78. The standard deviation of the pre-test was 43,917 and, in the post-test, it was 16,131; the results show dispersion, and in the post-test, the dispersion is lower compared to what was obtained in the pre-test but the data is similar. Mentioning the minimum, in the pre-test, it was 71 and a maximum of 215, and the post-test had a minimum of 69 and a maximum of 125.

According to the values of the test, it is determined that the students in the experimental group went from a level close to the *Rule of Thumb* in the pre-test to being closer to a *Good average* in the post-test; which means that the students developed the test in less time and significantly improved their working memory.

Table 7. Statistical analysis of the pre-test and post-test comparison of the variable Working Memory through the TMT test of the experimental group.

Tail Making Test – Pre-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	134,20	138,00	94 ^b	43,917	71	215
Trail Making Test – Post-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	86,27	82,00	78 ^b	16,131	69	125

*Note. Values considered in TMT test: 75 seconds equals **Good Average**; greater than 3 minutes represents **Rule of Thumb** and >273 seconds equals **Deficient**.*

Regarding to the control group, the pre-test obtained a mean of 178,47 which means that they were closer to the *Rule of Thumb*, and in the post-test, the mean was 137,27 and although the time decreased, they remain closer to the *Rule of Thumb* than the *Good average*. The median in the pre-test was 145,00 and it means that the 50% is above this level and the other 50% is below this level; in the post-test, the median was 142,00 which means the 50% is above and the other 50% is below this level. The mode in the pre-test was 136 and the post-test was 186. The standard deviation of the pre-test was 54,571 and, in the post-test, it was 38,596; despite the improvement in dispersion, it is still a very high number for the standard deviation. Finally, the pre-test had a minimum of 123 and a maximum of 316, and the post-test had a minimum of 71 and a maximum of 205.

According to the test values in Table No. 8, although the students in the control group improved from pretest to post-test, they remained at a level closer to the *Rule of Thumb* than to the *Good average*; that is to say, the students developed the test in less time, but they still did not achieve a significant improvement in their working memory.

Table 8. Statistical analysis of the pre-test and post-test comparison of the variable Working Memory through the TMT test of the control group.

Trail Making Test – Pre-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	178,47	145,00	136	54,571	123	316
Trail Making Test – Post-test						
Sample	Mean	Median	Mode	Standard Deviation	Minimum Value	Maximum Value
15	137,27	142,00	186	38,596	71	205

*Note. Values considered in TMT test: 75 seconds equals **Good Average**; greater than 3 minutes represents **Rule of Thumb** and >273 seconds equals **Deficient**.*

4.1.2 Normality test TEVI R pre-test and post-test

According to the normality test, it is necessary to mention that in a quantitative study is essential to verify the normality of the samples since if they are normal, parametric statistical methods can be applied; but if they are not normal, non-parametric methods must be used (Risk, 2003). As in this case can be evidenced that the significance levels must be above 0.05 ($>.005$), and it did not occur (See Table 9). Therefore, the variables did not have normality; for this reason, the non-parametric statistic was applied for the hypothesis test.

Table 9. Normality test TEVI R and TMT results

Pruebas de normalidad							
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Estadístico	Gl	Sig.	Estadístico	Gl	Sig.
English vocabulary learning – Pre-test		,170	30	,026	,917	30	,022
English vocabulary learning – Post-test		,204	30	,003	,917	30	,022
Trail Making Test – Pre-test		,236	30	,000	,912	30	,017
Trail Making Test – Post-test		,221	30	,001	,874	30	,002

Note. TEVI R – TMT pre-test and post-test normality test results.

4.1.3 Non-parametric test of related samples with Wilcoxon signed-rank test

Since the samples were not normal, the nonparametric test of related samples was used through the Wilcoxon test, which compares the mean range of two related samples to find whether or not there are differences between them. Considering the aforementioned, in hypothesis testing the significance

should be maintained in a range between 0 and ,005; the experimental group fulfills this value, and for that, they got significance in both TEVI R and TMT tests (See table No. 10).

Table 10. Results of the non-parametric test of related samples with Wilcoxon signed-rank test of the experimental group.

Test statistics ^{a,b}		
	English vocabulary learning – Post-test / Pre-test	Trail Making Test – Post-test / Pre-test
Z	-3,409 ^c	-3,295 ^d
Sig. asintótica (bilateral)	,001	,001

Note. Results of the non-parametric test of related samples in the experimental group.

According to the range mentioned before, the control group was only significant in the TMT test since they were between ,005; while in the TEVI R test there was no significant improvement because they were in 0,682, it is to say, above ,005 (See table No. 11).

Table 11. Results of the non-parametric test of related samples with Wilcoxon signed-rank test of the control group.

Test statistics ^{a,b}		
	English vocabulary learning – Post-test / Pre-test	Trail Making Test – Post-test / Pre-test
Z	-,409 ^c	-3,039 ^c
Sig. asintótica (bilateral)	,682	,002

Note. Results of the non-parametric test of related samples in the control group.

Consequently, as the experimental group had significance in both variables, the alternative hypothesis is tested; as well as the control group with the Working Memory variable through the

TMT. However, in the vocabulary variable of the TEVI R test in the control group, the null hypothesis is tested.

4.2 Discussion

Considering the importance of expanding the information obtained, it has been taken into account the general objective of this research study, the hypotheses proposed, the results in the implementation of the instruments TEVI R and TMT (pre-test - post-test), and the interpretation and statistical analysis of these results. Hence, according to the data obtained, it is concluded that, after the implementation of the didactic unit "Challenging my mind" based on mnemonic strategies, statistical improvements through the SPSS program were obtained in the comprehension of English vocabulary and in working memory; however, it is necessary to mention that it was completely achieved in the experimental group, testing the alternative hypothesis; while in the control group, the alternative hypothesis was only proved in the working memory variable through the TMT, and in the vocabulary variable of the TEVI R test, it was proved to the null hypothesis. In other words, the target population showed an improvement in their working memory and English vocabulary learning processes after the intervention with the mnemonic method.

In this sense, the results demonstrate what was discussed above, since Baddeley (2010) mentions that working memory is a system that allows keeping things in mind while developing complex tasks such as comprehension, reasoning, and learning, for instance, in the acquisition of a foreign language. Now, it can be understood that working memory plays an important role in

English vocabulary learning since it is part of the language acquisition process because it relates to semantic, syntactic, and pragmatic processes, which are fundamental for the interpretation and production of spoken and written language (Baddeley, 1999). The data obtained from the application of the instrument show that the students are at a Great level in English vocabulary, the experimental group achieved changes before and after the tests, since in the pretest they achieved a mean of 62, which means that at the end of the intervention the students were at a Great level, in the post-test positive changes were seen, with a mean of 74 respectively, that is, they went from a Great to an Excellent level.

In addition, the introduction of vocabulary for learning a new language in children is fundamental since it allows a wide range of knowledge to acquire language, not only enriches the learning of a foreign language with vocabulary but also allows the student to defend themselves in any situation and make themselves understood through the production of language. In fact, there is little value in producing grammatical sentences if there is not an appropriate vocabulary, since conveying complete ideas can be easier if there is plenty of vocabulary knowledge. (Wilkins, 1972).

Taking into account that vocabulary learning influences the comprehension of a foreign language, it could be evidenced in this study that the constant interaction with a group of students facilitates fluent communication when there is good vocabulary storage as well as mentioned by Wang, Teng, & H, (2015) vocabulary acquisition enables the development of clear ideas and improves listening, speaking, reading, and writing skills.

On the other hand, the students of the control group did not improve in English vocabulary learning through the analysis of the statistical results, this means that if there is no structural

monitoring of strategies for students to support their cognitive process, they will not be able to succeed in the acquisition of vocabulary. This reaffirms the hypothesis of the researcher, that working memory and vocabulary learning can work together through the mnemonics method due to the student has the opportunity to use different strategies that develop communication skills in the foreign language within and outside the classroom.

It is important to consider that this work has a close relationship with backgrounds since it can be seen that memory is a key mental process in learning English as a second language as Calcina (2017) states, it is a fundamental strategy that helps students to improve their vocabulary through the immerse context and previous knowledge where the student develops. Thus, through the analysis of the results of this study, an improvement in English vocabulary and working memory is achieved in students of the study group, which were positive results that are considered for future studies related to memory and its development.

Finally, regarding the relationship of the instruments TEVI R and TMT tests, it can be considered that their implementation with the mnemonic strategy contributes to the development of cognitive processes in a foreign language due to the interaction with these tools enables participation, interpretation, production, and motivation for learning English in the educational context. For this reason, it can be deduced that implementing didactic units according to these tools contributes significantly to the strengthening and enrichment of vocabulary and working memory in students.

4.3 Conclusions

Considering the research question of this study How does the implementation of methodological strategies based on mnemonics affects English vocabulary learning and working memory in fourth-grade students at the Instituto Tecnico Diversificado Grajales (ITDG) from La Union - Valle? the objectives, the hypotheses proposed, and the statistical analysis of the data obtained, the researchers decided to establish conclusions based on these aspects in order to provide a better understanding of the study.

- Regarding the first objective, it was possible to identify through the Trail Making Test (TMT) pre-test, that most of the students had difficulties in their working memory capacity, due to the fact that it was difficult for them to retain the instruction the first time it was given to them, they were not only scattered during the test but they also broke the sequence of letters and numbers or they took a long time for this basic operation. Otherwise, very few children managed to develop the objective of the test without major difficulty, that is, they completed it in the shortest possible time, obtaining a score that is close to the ideal average (75 seconds), showing an excellent performance in working memory skills. Accordingly, it became evident that the experimental group needed a plan to improve their working memory capacity, an intervention that was developed through the mnemonic strategy.
- As well as, the identification of the low comprehension of vocabulary was determined by the application of the TEVI R test, an instrument that allowed to know the repertoire of words that students have about objects and concepts of everyday life in English, which

when analyzing the results reflected a problem of lack of vocabulary in the fourth-grade students. Therefore, it is intended to carry out a series of interventions through the mnemonic method that allows students to develop their listening, reading, speaking, and writing skills in the foreign language since this method contributes to the development of English skills.

- Concerning the implementation of the didactic unit "Challenging my mind" it can be considered that the design of activities based on the mnemonic strategy demonstrated in the results that the students of the experimental group were able to acquire English vocabulary through constant interaction with the didactic unit. This shows that the understanding of mnemonics not only influences learning but also memory processes, which is understood as the conscious knowledge and control that the individual has over the functioning of the mnemonic. In addition, it is concluded that this strategy offers the opportunity to be used by any educational institution that has the technological and didactic resources to be replicated, even opening the possibilities of focusing on other skills and language fields.
- After comparing the results obtained, it was evidenced through the implementation of the strategies based on the mnemonics method, that the experimental group got an improvement in both instruments, therefore, the alternative hypothesis was tested; however, the control group only improve in the TMT, proving the alternative hypothesis in that variable, and the null hypothesis in the TEVI R.

4.4 Recommendations

In this session, some suggestions are presented since are considered relevant to continue contributing significantly to the improvement of the English vocabulary of the students, not only of the selected sample but also, of the institution in general.

- It is recommended that the Instituto Tecnico Diversificado Grajales use the didactic sequences as support material for a better interaction with the foreign language, providing a previous explanation to the teachers in charge of the English subject in order to use these resources in the classroom.
- It is advisable to perform this study with a larger sample, allowing a more general view of the English vocabulary level and memory capacity of the students.
- It is convenient to carry out for future studies, mnemonics as a method that helps students to acquire short-term memory strategies. Also, to continue monitoring this method in the classes since allows to register and evaluate their performance, having a clear objective of memory activities and what it is intended to achieve. Thus, relate it to different areas of knowledge, not only in English but consider it in other educational fields.

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Anexos

CONSENTIMIENTO INFORMADO – INFORMACIÓN AL PARTICIPANTE

Antes de proceder a la firma de este consentimiento informado, lea atentamente la información que a continuación se le facilita y realice las preguntas que considere oportunas.

Título y naturaleza del proyecto:

Estrategias basadas en método mnemotécnico para incidir en el aprendizaje verbal, la memoria de trabajo, y el aprendizaje del vocabulario en inglés en los estudiantes de cuarto grado de primaria del Instituto Técnico Diversificado Grajales.

Esta investigación busca analizar cómo la implementación de estrategias metodológicas basadas en la mnemotecnia incide en la memoria de trabajo y el aprendizaje del vocabulario en inglés en los estudiantes de cuarto grado (4°) del Instituto Técnico Diversificado Grajales (ITDG) de La Unión-Valle. Por ello, las investigadoras proponen estimular la memoria de trabajo como componente cognitivo que contribuye al proceso de aprendizaje del vocabulario inglés para comprender en profundidad la realidad situacional que interviene en el aula.

Le informamos de la posibilidad de participar en un proyecto que se plantea los siguientes objetivos:

Objetivo general:

Analizar cómo afecta la implementación de estrategias basadas en el método de la mnemotecnia, el aprendizaje verbal, la memoria de trabajo y el vocabulario de aprendizaje del inglés en los estudiantes de cuarto grado (4°) del Instituto Técnico Diversificado Grajales (ITDG) de La Unión - Valle.

Objetivos específicos:

1. Identificar el nivel de vocabulario en inglés de los estudiantes de cuarto grado (4°).
2. Identificar el aprendizaje verbal y el desarrollo de la memoria de trabajo de los estudiantes.
3. Implementar estrategias basadas en el método mnemotécnico de la población.
4. Contrastar los resultados de los alumnos tras la aplicación de las estrategias basadas en el método mnemotécnico.

Se alcanzarán estos objetivos por medio de la aplicación de los siguientes instrumentos:

Test de aprendizaje verbal Taveci.

Consiste en evaluar el funcionamiento del sistema de aprendizaje y memoria y determinar si alguno de sus componentes es el que está fallando. También, esta prueba permite evaluar variables como la curva de aprendizaje, la estabilidad del aprendizaje, la retención de la información a corto

y a largo plazo, el uso de estrategias de aprendizaje y de recuperación de la información, la susceptibilidad a la interferencia o a la discriminabilidad del aprendizaje.

Memoria de trabajo: Test de memoria de trabajo o test del trazo Trail Making Test (TMT).

Es una prueba neuropsicológica de atención visual y cambio de tareas, consta de dos partes en las que se le indica al sujeto que conecte un conjunto de 25 puntos tan rápido como sea posible sin dejar de mantener la precisión. La prueba puede proporcionar información sobre la velocidad de búsqueda visual, el escaneo, la velocidad de procesamiento, la flexibilidad mental y el funcionamiento ejecutivo.

Riesgos de la investigación para el participante:

No existen riesgos ni contraindicaciones conocidas asociados a la evaluación y por lo tanto no se anticipa la posibilidad de que aparezca ningún efecto negativo para el participante.

Derecho explícito de la persona a retirarse del estudio.

- La participación es totalmente voluntaria.
- El participante puede retirarse del estudio cuando así lo manifieste, sin dar explicaciones y sin que esto repercuta en usted de ninguna forma.

Garantías de confidencialidad

- Todos los datos carácter personal, obtenidos en este estudio son confidenciales y se tratarán conforme a la Ley de Protección de Datos, Ley 1581 de 2012.
- La información obtenida se utilizará exclusivamente para los fines específicos de este estudio.

Si requiere información adicional se puede poner en contacto con nuestro personal de la Unidad Central del Valle del Cauca, con la/el docente: *Claudia Patricia Rivera Sánchez* en el teléfono Tel: (2) 2242202 Ext: 204 o en el correo electrónico: *cprivera@uceva.edu.co*

Estrategias basadas en método mnemotécnico para incidir en el aprendizaje verbal, la memoria de trabajo, y el aprendizaje del vocabulario en inglés en los estudiantes de cuarto grado de primaria del Instituto Técnico Diversificado Grajales.

Yo (Nombre y Apellidos):con
CC.....

- He leído el documento informativo que acompaña a este consentimiento
- He podido hacer preguntas sobre el estudio
- He recibido suficiente información sobre el estudio
- He hablado con el profesional informador: (*Carolina Álvarez Rivera y Angie Stefany Ocampo Aguirre*)
- Comprendo que mi participación es voluntaria y soy libre de participar o no en el estudio.
- Se me ha informado que todos los datos obtenidos en este estudio serán confidenciales y se tratarán conforme establece la Ley de Protección de Datos, Ley 1581 de 2012.
- Se me ha informado de que la información obtenida sólo se utilizará para los fines específicos del estudio.

Comprendo que puedo retirarme del estudio:

- Cuando quiera
- Sin tener que dar explicaciones
- Sin que esto repercuta en usted de ninguna forma

Presto libremente mi conformidad para participar en el *proyecto titulado Estrategias basadas en método mnemotécnico para incidir en el aprendizaje verbal, la memoria de trabajo, y el aprendizaje del vocabulario en inglés en los estudiantes de cuarto grado de primaria del Instituto Técnico Diversificado Grajales.*

Firma del participante

(o representante legal en su caso)

Nombre y apellidos:

Fecha:

Firma del profesional

informador

Nombre y apellidos:

Fecha:

ACTIVITIES

WEEK: 1	SUBJECT: English	TIME: 50 Min
ACTIVITY: Weekly activities		SOURCES: Flashcards

OBJECTIVES:

Students will be able to remind specific daily activities presented in different days of the week.

DESCRIPTION:

The teacher will give two cards to each student that contain as a title a day of the week and in addition, different written and illustrated daily activities such as playing basketball, playing outside, walking the dog, doing homework, piano class, listening to music and so on. The students will have 10 minutes to listen to the pronunciation and read the activities on each card; then they will turn the cards in to the teacher and will try to mention the information for each day. After that, they will have 10 minutes to make a free drawing and at the end, they will return to the teacher to receive the cards for 5 more minutes and this time, mention the name of the days and the corresponding activities.

The following day, before starting the intervention, a space will be used for the students to mention again the days and activities that corresponded to them.



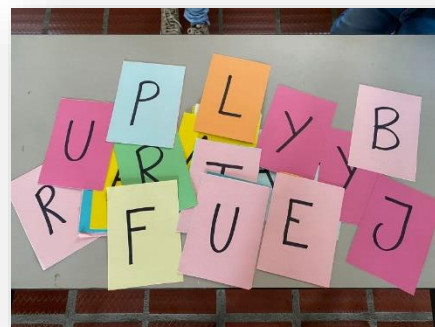
WEEK: 2**SUBJECT:** English**TIME:** 50 Min**ACTIVITY:** Forming the months**SOURCES:** Cards with isolated letters**OBJECTIVES:**

Students will be able to organize the letters that form the months of the year in their correct spelling without a reference; it is to say, without first seeing the names of the months.

DESCRIPTION:

The teacher will give cards with different letters that form the names of the months of the year. The idea is that the teacher assigns a month to each student; once a student completes the name correctly and pronounces it, the teacher will assign another one, and so on. If the students do not organize the name of the month correctly, they should try it again.

It is necessary to mention that the months are assigned randomly. Moreover, through this activity, the students will not only remember the correct written form of the months, but also the pronunciation.

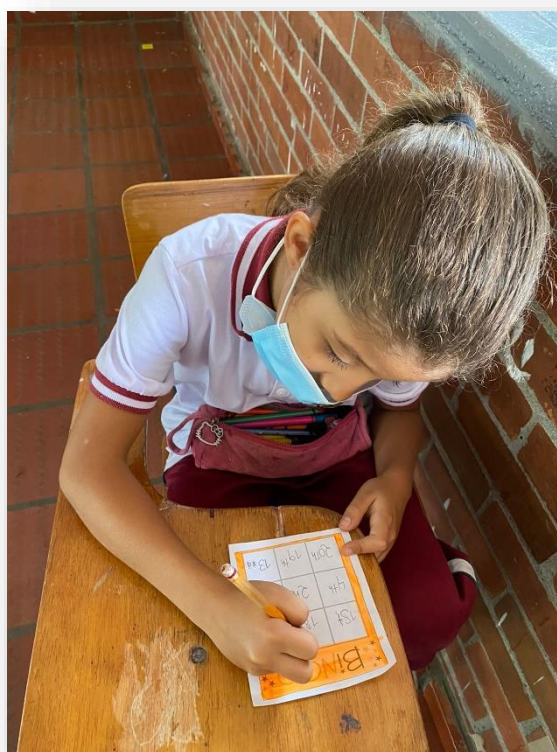
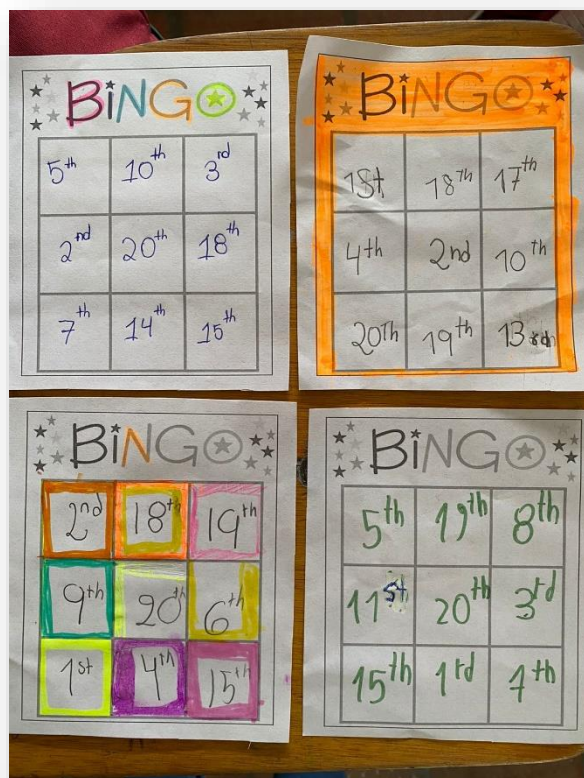


WEEK: 3**SUBJECT:** English**TIME:** 50 Min**ACTIVITY:** Ordinal numbers bingo **SOURCES:** Bingo templates / Online spinner wheel**OBJECTIVES:**

Students will be able to recognize ordinal numbers through their listening skills.

DESCRIPTION:

After some explanatory classes about ordinal numbers, a bingo game will be played; for this, each student will have a bingo template to fill in with the ordinal numbers of his or her choice from 1st to 20th. Then, the teacher will start mentioning the numbers through the online spinner wheel, and the students who form vertical or horizontal lines and squares will be the winner.

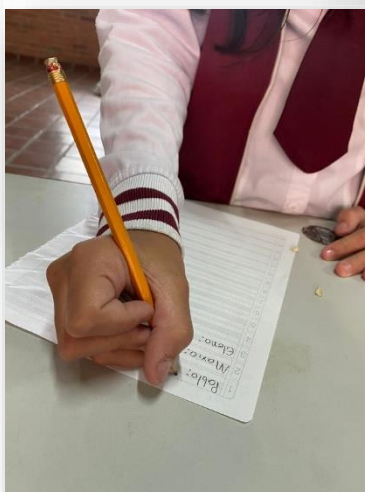
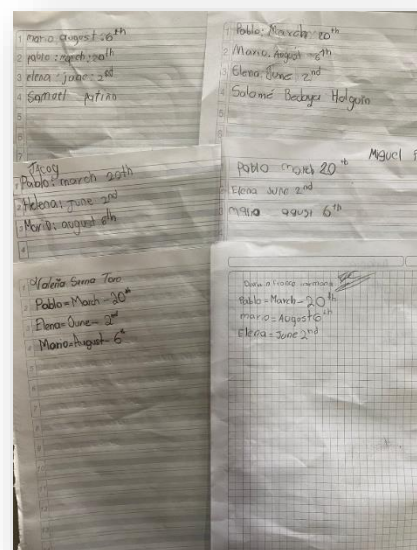


WEEK: 4**SUBJECT:** English**TIME:** 50 Min**ACTIVITY:** Listening special dates **SOURCES:** Text, pieces of paper and pencils.

OBJECTIVES: Students will be able to organize the information about dates correctly according to what they hear.

DESCRIPTION:

The teacher will read a short text about the birthday of three different people; the students will listen to the text that the teacher will read two or three times and only when the reading is finished, students will immediately write the names of the three people mentioned, adding to each one the correct birthday date. The students should write the information in the same order as it is mentioned in the text.



WEEK: 5**SUBJECT:** English**TIME:** 50 Min

ACTIVITY: Parts of the day**SOURCES:** Flashcards

OBJECTIVES: Students will be able to remember the different parts of the day associated with daily activities.

DESCRIPTION:

The teacher will start by showing the flashcards one by one, and at the same time pronouncing it, which will have different images and words for the different parts of the day: in the morning, in the afternoon, at noon, in the evening, at night. and vocabulary related to each of them. Then she will ask a student to go outside and take out one of the flashcards without his or her classmates seeing which one he or she took out. The teacher will start asking which card is missing, students will have to look back at the board and try to guess which one it was.

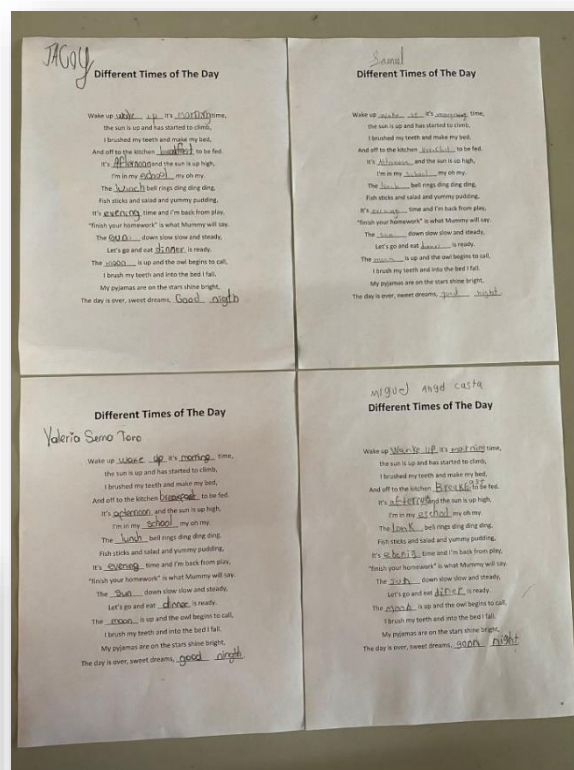
After most of the students have participated, the teacher will start again, but this time more cards will be drawn, so they will try to remember more words and pictures.



WEEK: 6**SUBJECT: English****TIME: 50 Min****ACTIVITY: Song****SOURCES: Computer, speakers.**

OBJECTIVES: Students will associate the vocabulary they hear from the song with the written lyrics.

DESCRIPTION: The teacher will play a song about the parts of the day several times while the learners listen and watch the video of the song, then the teacher will pass the lyrics of the song to the participants, however, if the lyrics are incomplete, the learners will have to complete them with the word they hear in the song. This activity focuses on listening memory and helps to highlight the vocabulary seen in class about the parts of the day.



WEEK: 7**SUBJECT:** English**TIME:** 50 Min**ACTIVITY:** Dices – Roll it, tell it, cover it**SOURCES:** Board game

OBJECTIVES: Students will associate analog time with digital time in an explicit chart by highlighting them with color.

DESCRIPTION:

For this class each student has a photocopy of the activity in which they will be attentive to a die that they will see on the TV screen, the teacher will play the die while the students will look for it on the game board and highlight it with different colors. This educational material allows the student to stimulate several cognitive and sensory domains such as visuospatial ability, reasoning, language, attention, semantic memory, and short-term memory.



WEEK: 8**SUBJECT:** English**TIME:** 50 Min**ACTIVITY:** Shopping at the mall**SOURCES:** Category box

OBJECTIVES: Students will be able to classify different items in the correct “store” according to what they hear.

DESCRIPTION:

The teacher will start reading a text that has information about items bought in different stores; then, the students will go to play outside for 10 minutes. After that time, the students will return to the classroom, and the teacher will give each student a category box, in which they will classify the items in the correct group according to the text.

It is necessary to mention that the text will be read-only twice in the first session of the activity.

