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Topic:

**METACOGNITIVE STRATEGIES IN DEVELOPING CRITICAL THINKING IN
ENGLISH AS A FOREIGN LANGUAGE**

**Research project prior to obtaining the title of Master in English Pedagogy as a
Foreign Language**

Line of research:

Applied linguistic

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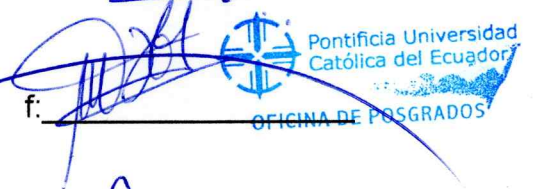
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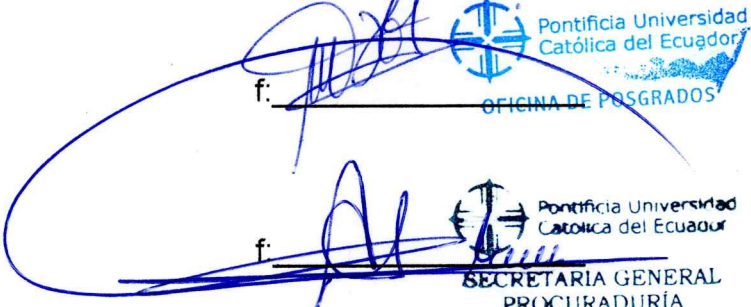
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I would like to recognize to Pontifical Catholic University of Ambato for the opportunity to access knowledge.

I also would like to encompass my appreciation and thanks to Varna Hernandez my director, whom I thank for their guidance, trust, and knowledge to guide my research work.

DEDICATION

To my mother, my dad, my sons, to Soledad Miranda my friend and family, OB, and to my friends: Varna Hernandez, Osmany Perez, Evelyn, Olguita, Marco C, JJ.

SUMMARY

La enseñanza de idiomas en el siglo XXI requiere que los profesores creen y desarrollen condiciones para que las habilidades de los ciudadanos se adapten a la situación existente. El actual trabajo de investigación examina la correlación entre el uso de la metacognición y sus estrategias para el desarrollo de las habilidades de pensamiento crítico en inglés como lengua extranjera. Esta investigación trabaja con la hipótesis de que el uso de estrategias metacognitivas desarrolla las habilidades de pensamiento crítico en inglés como lengua extranjera (EFL). Esta investigación tuvo un enfoque cuantitativo con un diseño cuasi-experimental y un estudio correlacional con el uso de un pre-test y post-test a través de dos instrumentos, los cuestionarios: Metacognitive Awareness Inventory (MAI) y Cornell Critical Thinking Test Level Z, a 50 estudiantes de cuarto nivel de la Escuela de Idiomas y Lingüística de la PUCESA (Cursos de Inglés: Regular y Abierto) modalidad virtual, que participaron en la investigación. Mediante el uso de las pruebas Kolmogorov-Smirnov test for Metacognition and Critical Thinking y U-Mann Whitney test se obtuvo una correlación positiva entre la metacognición y el pensamiento crítico. Las conclusiones muestran que cuantas más estrategias metacognitivas utilicen los estudiantes, más pensamiento crítico será potenciado.

Palabras clave: estrategias metacognitivas, habilidades de pensamiento crítico

ABSTRACT

Language teaching in the 21st century requires teachers to create and develop conditions for citizenship skills to adapt to the current situation. The recent research paper examines the correlation between the use of metacognition and its strategies for developing critical thinking skills in English as a foreign language. This research works with the hypothesis that using metacognitive strategies develops Critical thinking skills in English as a foreign language (EFL). This research had a quantitative approach with a quasi-experimental design and a correlational study with the use of a pre-test and post-test through two instruments, the questionnaires: Metacognitive Awareness Inventory (MAI) and Cornell Critical Thinking Test Level Z, to 50 fourth level students of the School of Languages and Linguistics of PUCESA (English Courses: Regular and Open) virtual modality, who participated in the research. A positive correlation was obtained between metacognition and critical thinking using the Kolmogorov-Smirnov test for Metacognition and Critical Thinking and the U-Mann Whitney test. The conclusions show that the more metacognitive strategies students use, the more critical thinking will be enhanced.

Keywords: metacognitive strategies, critical thinking skills.

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INTRODUCTION

Today, in the education field, it is being discussed the skills and competencies that 21st-century citizens must possess, groups like Apollo Education Group and Global project for education, where 21st Century Skills are considered as the main point to be developed in their agendas, mentioning what the competencies and skills students need to have, include four mainstays: 1. learning to Know, 2. learning to Live Together, 3. learning to Do, and 4. learning to Be. In this last aspect, there is an emphasis on the initiative of using autonomy and personal responsibility, emphasizing autonomous, regulated, and continuous learning (Scott, 2015). However, the parts mentioned in the mainstays remain unknown in the teaching-learning process in everyday practice because teachers are concerned more about developing just certain features of language skills to communicate rather than help students become more conscious about how they learn or if they are learning appropriately.

This section related to the mainstays highlights autonomy and regulated learning, which are the aspects considered in metacognition. Flavell (1979) describes how a person can know his own thinking process, emphasizing the type of learning that passes through various experiences. This reflects that the thinking process is complete when people can learn to think, reflect on their own process, and think to learn. Furthermore, the most important thing is to involve people in the learning process and be active from how they learn but seeing inside themselves. This includes what strategies help them to learn, evaluating the effectiveness of the strategy they choose, and then applying the best strategy to learn optimally (Schraw & Dennison, 1994). Therefore, if we use metacognition, we will have a better development of cognition, which leads to having critical thinking skills (CT) as a result of this process.

Critical Thinking “involves examining beliefs, knowledge, and information in the light of supporting evidence and any conclusions that can be drawn after the use of tools to improve your own thinking process” (Matthews & Lally, 2010). Thereby, metacognition is related with CT because it requires to be conscious of the process how we reflect,

and beyond that how we organized the way we think to solve any problem. This is an important aspect to be considered in curriculum, education process and teaching practice.

Education nowadays seeks to develop thinking since this society is considered the society of technology. For this, it should consider the skills and abilities that have to remain in the long term and help solve today's problems. Hence, metacognition and critical thinking are skills to be developed to be integrated into learning. This requires structural changes in the teaching process, the approaches we use, and the way of how learning is visualized.

Ecuador started conversion in its educational system in the last ten years; for this, the Ministry of Education has associated with the Common European Framework of Reference for languages (CEFR) standards, and has considered applying Content Language Integrated Learning (CLIL) to reach international standards. In CLIL, we observed a different perspective about teaching a language within different contexts, including preparing students for the global community and developing XXI century skills (Grounds et al., 2014). The main purpose of these particular approaches and international agendas is to help students develop appropriately to be part of the society of knowledge, with the appropriate skills, in this case, high-level thinking skills. Therefore, the teachers must know these aspects to apply in class, and the students acquire the skills mentioned. However, this is not what happens in real practice.

As Bloom's Taxonomy explains, part of learning is developing high thinking skills with the use of communicative linguistic competencies, which are presented in this project as a necessity in today's learning. This aspect requires that teachers possess an adequate methodological background, which is not encouraging right now. High thinking skills based on Bloom's taxonomy implies that cognitive processes have to be developed stage by stage, under rigorous control, and based on the theoretical components.

This means that the people involved in the education process of the importance of applying the appropriate strategies and that the teaching practice has to be applied in the micro-lessons carefully, so they reach the main goal in developing these skills apart from only teaching to manage a foreign language (El Telégrafo,2014). Teachers are not aware of working neither from the perspectives of this umbrella approach nor to the methodological background to work on metacognitive strategies to work on critical thinking skills. Nevertheless, in the third domain in the National Curriculum, the use of "evidence-based practices and strategies related to planning, implementing, and managing standards-based English and content instruction" according to the Ministerio de Educación del Ecuador in 2012, those aspects that are not considered in the lesson planning. Also, it is mentioned that teachers have to identify and apply strategies to develop the skills that are established in this National

Program and metacognitive strategies are not even brought up in our context, this is the reason why teachers neither give importance to how students learn nor to the process how students work individually. The new way of teaching is an inquiry, a profound process that requires new skills that can answer to current necessities. It does not mean to give students textbooks, lectures, and notes; let them explore and find answers on their own. This is one of the main mistake's teachers do in their daily work when they want to apply autonomous work. Education is a learning process, and how students learn is an aspect that lends itself to having students explore, make predictions, and engage in problem-solving in any area of study. Sciences nowadays, no matter the field, is all about using critical thinking skills, problem-solving, and reasoning through data. Students need opportunities to make their discoveries and assumptions about how they learn.

The languages school applies a Communicative Language Approach, and other approaches, which are useful for learning the language, but the use of metacognitive strategies is not considered even for upper levels. The book that is used to teach in the university has a section that is specifically for developing critical thinking skills. Nevertheless, it is taught as any of the other parts of the book like the grammar parts

or vocabulary. Teacher's strategies are focused on the different skills, and they do not work or considered the metacognitive part in the learning process even with the activities done in the platform MYELT which is no supervised by teachers and students do not use it, as a tool for self-assessment or as a tool to check their progress because they do not see the need to monitor what they do in this virtual platform. Consequently, there is the need to think about the use of strategies to cover these aspects and develop them to have better results and help students acquire 21st century skills.

Teachers at Catholic University in the English Department do not know what metacognitive strategies are; they neither know how to apply them nor how they contribute to developing critical thinking skills in the students, which is a requirement and part of the primary purposes of the book use in everyday classes. Teachers ignore how to work with these strategies. Also, they do not consider critical thinking skills as an essential part of the language skills this is not considered in the microplanning or just worked as other activity set in the book.

In the Pontifical Catholic University from Ambato, the methodology strategies and techniques used by teachers in the language school need to consider that students have to be more active and become aware of what they are doing for their own learning process, how they are applying all the strategies checked in class to solve other tasks, which, in general terms means that metacognitive strategies are needed. Students are given different strategies and techniques where they can practice how to complete an activity. Still, despite this, when students move to a new level, they forget what they have reviewed before and tend not to know how to work on certain developed tasks.

The problem arises because students follow instructions thoughtlessly, and they are not able to recognize the situations they face in the classroom in the various activities, specifically what strategies are needed or what knowledge should be applied when performing a task. They cannot do this because the class objectives do not support the strategies used and the knowledge base is not adequately developed, as there is no cognitive monitoring of what is being done.

They do not even have their own goals while learning. Besides, once the tasks or activities are established, the students do not know how to use their knowledge or what strategies they have to do to solve a problem, in several cases due to lack of knowledge of the name of the strategies or the strategy indeed, and in others due to lack of motivation, which leads to a lack of awareness of how to learn, even though they are able to complete tasks by mere repetition. Once the results are obtained, they are not evaluated or reviewed to know what remains to be done.

In teaching English, teachers need to deal with the aspects mentioned before about metacognition if they want to develop critical thinking as the books required. Even though the teacher uses different methods, techniques, and strategies; some elements are missing, which do not take into account how what they are receiving is been used in and outside the classrooms to help them learn appropriately.

The following questions are posed for this problem: what correlation exist between metacognitive strategies and Critical Thinking Skills in English as a Foreign Language (EFL)?

General Objective:

To apply metacognitive strategies to development of Critical Thinking in English as a Foreign Language (EFL) in the School of Languages and Linguistics in the Catholic University (PUCESA).

Specific Objectives:

1. Diagnose the state of the variables before and after applying the strategy, analyzing the theoretical aspects and components of metacognition, critical thinking, strategies related and how to apply them.
2. Use metacognitive strategies to develop critical thinking skills in English as a Foreign Language of students from School of Languages and Linguistics of PUCESA.

3. Determine the relationship between metacognitive strategies to have critical thinking in English as a Foreign Language of students from the School of Languages and Linguistics of PUCESA.

Hypothesis

This research works with the hypothesis that the use of Metacognitive Strategies does develop Critical Thinking Skills in English as a Foreign Language (EFL). Focusing on what global education requires its international agenda, which is the main consideration set as a justification for this research, it is taken into account what the investigation Partnership for Education (GPE) mentions that students need to have specific skills so they can live, work in their own communities, countries, and the world in this XXI century. Therefore, teachers must know, develop, and apply strategies that help students be ready and acquire what is necessary to prepare for the future.

Twenty-first-century skills are abilities and attributes that can be taught or learned in order to enhance ways of thinking, learning, working and living in the world. The skills include creativity and innovation, critical thinking/problem solving/decision making, learning to learn/metacognition, communication, collaboration (teamwork), information literacy, ICT literacy, citizenship (local and global), life and career skills, and personal and social responsibility (including cultural awareness and competence) (GPE ,2020, p.V).

This means that teachers and all the people who are related to the educational field have to consider what is required to do in the classroom to follow international agendas. We have to look for and work for our students so they can be able to live in this world with the necessary techniques and skills to transform it, and then turn the reality into a better society in behalf of the progress of their own communities. Thus, the university and the teacher's team have to modify their way of teaching to embrace these considerations and change the approach at the moment of instruction, adding the aspects stated for the XXI century skills.

Objective number one mentions that it seeks to achieve a dignified life for all people. Besides, it intends to promote a development that allows people's empowerment during the entire life cycle through quality education and training. This is done to empower the human capacities and talents of the human being, conceiving education from a humanistic view of lifelong learning for social, economic, and cultural development. (National Plan for Good Living 2017-2021). According to the planning of SENPLADES, objective 2 mentions the need to improve the capabilities and potential of citizens, which requires that each individual is responsible for their own learning and training so that they can solve the problems that exist in society using their own skills. This leads to the conclusion that students and people who want to learn for a better quality of life should be provided with tools.

CT in learning and teaching process are related aspects but not understood in their many issues. In the research work: "Critical Thinking Concept Reconstructed" gathers theoretical information and does a literature review on the main aspects about how to develop CT inside the classroom, self-awareness, and self-assessment are the most important points to develop in class, which means that metacognition is necessary as part of the strategies that have to be applied so we can get CT as a result of the teaching process. In this paper, the results imply self-assessment, which leads to creating awareness of their personal frames so the thinking process can be used in whatever format (Minter, 2010, p. 8). This work relates both aspects: the use of metacognition in especially the ability to motivate oneself and the use of self-assessment, and, on the other, the blooming of critical thinking, thanks to the application of metacognition.

In the research: "Implementing tasks that stimulate critical thinking in EFL classrooms" the aim of this paper was to arise awareness in CT through English and some reflection strategies, and methodological strategies. They applied CT related tasks which require reflection and argumentation where all the skills were needed to put in practice and develop self-determination and decision making. This theoretical work mentions that in these activities, participants will have the opportunity to stimulate their metacognitive processes as well as to exercise their mental skills such as reflecting, self-assessing,

arguing, and evaluating (Martínez & Niño, 2013). This means that learners will achieve a level of comprehension of real life, make more intelligent decisions, and act in a more conscious way and could be replied in other subjects.

The buildout of CT through the application of metacognition set for context of language learning, is explained by Sadeghi, Bahador in the research: “The Relationship between EFL Learners, metacognitive strategies, and their critical thinking”, where they showed a correlation between metacognitive strategies and CT. In this research, two questionnaires were applied: The Metacognitive Strategy Questionnaires and California Critical Thinking Skills Test. After applying metacognitive strategies, the results directed an association between both variables, which in this case the results suggested that the use and application of metacognition does develop CT, enhancing the way students learn (Sadeghi et al., 2014). This means that in the classroom, the application of these strategies has a helpful effect to bloom critical thinking. This led this research to apply a similar procedure to obtain similar results. However, different instruments will be applied to obtain the same results so students can achieve more regulation skills.

Regulation and reflection were the main aspects considered for the metacognitive area which were applied in a lesson in the research: “Development of Critical Thinking with Metacognitive Regulation and Toulmin Model” It focused on studying the self-evaluation to one's own problem-solving procedures. The Critical Thinking Disposition Scale was applied and Toulmin model Rubric to analyse the CT dispositions. The results mentioned that at the end of the lesson all Toulmin model work sheets written by students. It was discovered that students solve problems logically. It was shown that students are aware of the importance and usefulness of considering rebuttal evidence using the critical thinking rubric and Toulmin model combination (Gotoh, 2017). This researched aimed to get a better process in the self-awareness needed to develop CT which was obtained at the end of the data collection.

In other work, it is mentioned that they found out that the use of metacognition set in the context of language learning develops CT, which is explained by Sadeghi, Bahador, in the research “The Relationship between EFL Learners, ” Metacognitive Strategies, and their Critical Thinking”, where two instruments were used (The Metacognitive Strategy Questionnaires and California Critical Thinking Skills Test for). After applying metacognitive strategies, the results showed that there was a direct relationship between them and CT. The results showed that as much metacognitive strategies are used, the more benefits students get to develop CT (Sadeghi, Hassani, y Rahmatkhah, 2014). This means that applying metacognitive strategies in the classroom increase CT in tasks-controlled activities and the ones which are set in the classroom, which is a positive result to consider so similar results can be obtained.

In the research “Metacognitive learning in English writing as a foreign language by university students” by Chumana, S., Jiménez, S., and Martínez, C. (2019), in a qualitative study they found that in Escuela de Lenguas de la Pontificia Universidad Católica del Ecuador, they recognized applying metacognitive strategies is an important tool to get as a result, autonomous learning and overall to form critical thinking. They found that in the planning process, students do not consider or are conscious about this step due to the lack of knowledge and practice of this step. Therefore, there is a need for teachers to apply cognitive and metacognitive strategies for writing.

Bonilla, T. and Dias, L. (2018), in the research work: Metacognition in second language learning: Strategies, instruments, and evaluation, work indicates the use of instruments to evaluate the performance of tasks, especially when having to develop activities in a second language (L2) and how it is perceived to learn the language. It is mentioned that the use of this approach to evaluate and monitor learning influences the way of learning the L2 and allows reviewing existing problems and correcting them. It is concluded that metacognition expand the teaching-learning process of an L2 since they help to reflect and make a better introspection of what is being learned. This can lead to use self-evaluation to help students monitor their activities and control learning.

In the research work of Ordóñez (2020): Metacognitive Strategies in Reading Comprehension, metacognitive strategies were applied to help improve reading comprehension, rubrics were used for the phases of planning, supervision, and evaluation, once the strategies were applied, the KET reading section test was applied. The results concluded that the strategies used help to create awareness for better understanding. However, there is no measurement of metacognition for the pre-and post-test process, the strategies for every part and phase specified, and how self-awareness is intended to be achieved.

Methodology

This study has a quantitative approach with the application of a quasi-experimental design, and a correlation study with the application of a pre-test and post-test through the use of two instruments: the first instrument is Metacognitive Awareness Inventory (MAI), and the Cornell Critical Thinking Test Level Z for high school students that included multiple-choice test to measure critical thinking. Through a process of expert validation using a Fuzzy Delphi, it will be determined which items and questions will be chosen from the tests and can be used to support the research. A Non-Probability Sampling was applied due to the total number of participants is 50, people who belong to fourth levels of the School of languages and Linguistics of PUCESA (English Courses: Regular and Open).

This research will expand the ideas about which methodological strategies must be considered in the education process and the importance for a learner-centered learning where students are in control for their own learning process, incorporating the importance on the individual work and how the student internalized what has been offered to his or her own learning about the language, the individual awareness of the student as to how he or she learns and how students care about how they can do a better job and be proactive, increasing their thinking skills and integrate them into the international requirements of professional training and become self-regulated learners.

CHAPTER 1. STATUS OF ART AND PRACTICE

1. Origin and historical development of Metacognition

By considering thought as an integral and fundamental part of human development, it leads us to reflect on how it has been studied, in terms of functions, characteristics, structures, among other aspects. In the work of Dewey (1910), How we think, some circumspections are established of how the reflective thought occurs, and it is described as a result of a process of filtering thoughts obtained through order and sequence, the same, that lead to have a final product. For this, it is necessary to execute sub-processes, such as perplexity, hesitation, doubt, and analysis, to obtain results. This implies the use of strategies that allow planning and guiding this process, in a more control way.

Constructivism, cognitive science, and the theory of the mind meet at the same point when they explain that there are mental processes, stages, and conditions to acquire knowledge and how we use it to transform the reality to appreciate, and study it. All these schemes define and study the learning process as Zimmerman (1998) mentioned as “a proactive activity, requiring self-initiated motivational and behavioral processes as well as metacognitive ones” or as is mention in (Amer 2006). But an essential aspect is how to state a higher thinking level, which is the capability to understand and reflect on the state of mind of oneself, and this last point needs to be developed by everybody.

Constructivism deals with the fact about how people know what they know, the nature of learning process, which is related to cognition, and also how learners are the main protagonist in their own learning. As we know, cognition refers to the mental procedure when people usually use to understand, solve, analyze, make a decision about certain situation. In the classroom we have to consider that the cognitive process to be developed adequately needs to be established in three parts: before, during, and after learning. Allowing better control of what you want to achieve within a given context.

The main idea is that learners construct their own understanding with the guidance of the teacher, these are the ones who should help students to acquire the capacity how to regulate themselves their way of learning, taking a more participative and active role in their learning, establishing short and long term objectives, monitoring how their acquisition process goes, and being able to evaluate (self-evaluate) their own achievements , and with the results, being able to modify the weak parts, so in that way be able to go beyond the requirements proposed in the curriculum and awaken their interest in other fields (Bruning et al., 2004; Geary, 1995).

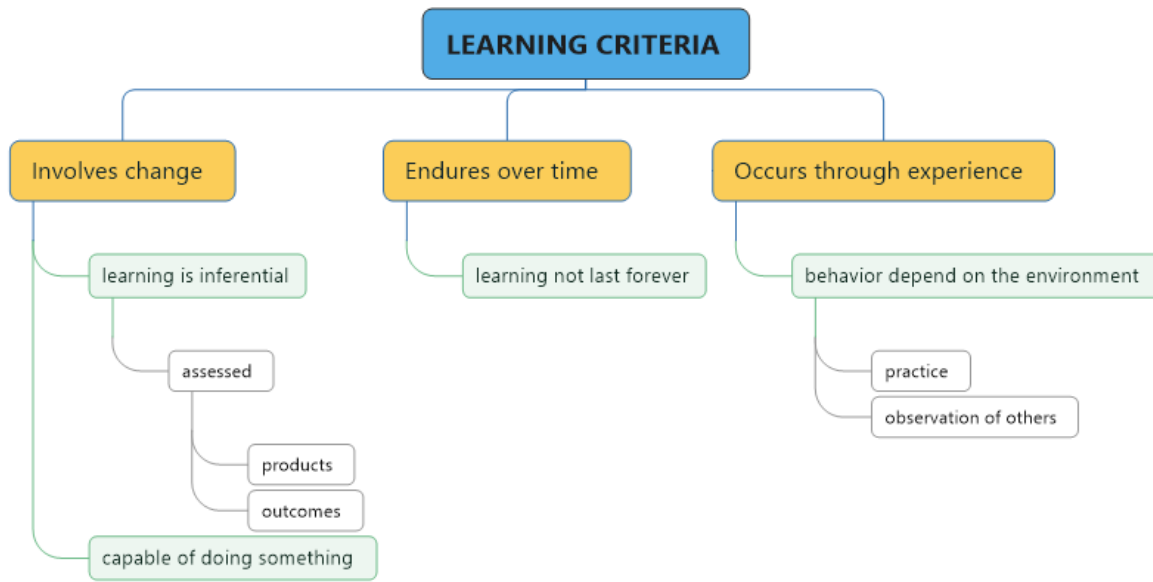
According to Schunk, (2012) "Learning is an enduring change in behavior, or in the capacity to behave in a given fashion". This means that learning comes as a result of the different sources provided by experience. When we talk about learning, we refer to how behaviors, skills and beliefs are modified based on an objective, which is supported by aspects such as materials, conditions, but mainly the environment. This means how we learn with others and from them. The trainer controls many of the aspects introduced in the learning as to the programmed activities; however, there is the internal individual aspect of how the student registers his own learning, and in what extent this goes hand in hand with what is planned, or with what was the students' own objectives.

1.1 Learning

The research from Gourgey (2002) mentions that according to the APA's Guidelines for the Teaching of Educational Psychology, in order to get the knowledge, is necessary to develop the process of questioning themselves, self-consciousness, and self-regulation. This means that, learning must consider different variables that affect and intervene directly or indirectly such as the learning materials and the learning environment that definitely determine whether the learning will be significant or not; for this, the teacher uses different learning strategies to achieve their goal in the classroom, on the other hand, there is an aspect that is left aside and is related to the

mind of the learner, which implies self-motivation to learn, cognitive state and self-awareness. Some criteria are considered in learning:

Figure 1
Learning Criteria



Note: The learning criteria is taken from Schunk, D. H. (2012). *Learning theories an educational perspective* sixth edition. Pearson.

As observed in the graph, we can identify that learning has three criteria that must be considered with variables in the process, since at the time of carrying out, it proceeds to make changes at the cognitive, procedural, and attitudinal level demonstrated through the evaluation at the end of each stage. Second, everything acquired can vary with time and even be erased despite having been learned, which leads us to foresee what strategies can be used later to avoid this aspect. Finally, the last criterion mentions the importance of practice and the relationship with others within a controlled environment that allows access to better learning.

According to the view of this trend of thought, these aspects depend on the social context and the mutual help between one person to another, developed by Vygotsky in the book *Mind in society*, consciousness and language are important aspects to

develop and contribute to a growth of the memory and how concepts are settled. The ability to think is more than just focusing on specific skills and procedures; it depends on habit and the materials, and these allow to enhance the development of an independent consciousness and people have the power to modify the environment where they are for their own purposes, and the most important point after mastering the linguistic process is to reach self-regulations of thoughts and actions (Vygotsky, 1978).

Vygotsky tried to demonstrate that the environment in which we learn with the collaboration and participation of others are not specifically focused on taking the knowledge and experience of others, but that we can be more aware of our own understanding concerning those around us and what our function is, and in turn, we can do to improve. This is the main purpose of Zone of proximal development is to create awareness as people interact in social environments and have self-regulation as a result of the procedure.

The aim is for the student to have access to cognitive mediators and control the task elements. Still, beyond this, it is to overcome those limitations within the task so that they can create scaffolding and improve their perception of how to do a task. The high point is understanding in the learning process, which implies completing other cognitive processes to reach a high-order of thinking, Bruner (1996) mentioned:

Being able to “go beyond the information” given to “figure things out” is one of the few not comparable joys of life. One of the great triumphs of learning (and of teaching) is to get things organized in your head in a way that permits you to know more than your “ought” to. And this takes reflection, brooding about what it is that you know (p. 129).

For this reason, Brown (1978), talks about the conscious control of one's activities for all forms of knowledge, through an executive control of the routines available to the knowledge system. In this way, it has to be considered, which knowledges and which

we do not possess of something determined. In this respect, Nelson (1988, 1990), explains that, there is a judgment to predict and evaluate contents and processes, where our inner mental content can be determined, measuring the accuracy of introspection to judge before and after. This means that predictive judgments are those that will determine what is to be monitored or controlled in relation to the cognitive processes. Specifically, we speak of the monitoring and control of certain knowledge that interacts in the educational context.

Fuson in 1979, talks about certain speech experiences (private speech) whose function is not specifically to communicate and socialize what is being discussed, which leads to creating an internal process of self-regulation. Meichenbaum in 1977 and 1986, mentions procedures for solving problems using a type of self-instruction, where the learner asks himself if his procedures are adequate if he is given adequate attention, if he has planned and if this is being monitored to achieve what is set out and acquire high intelligence and a better learning. This indicates that the metacognition process appears or are needed.

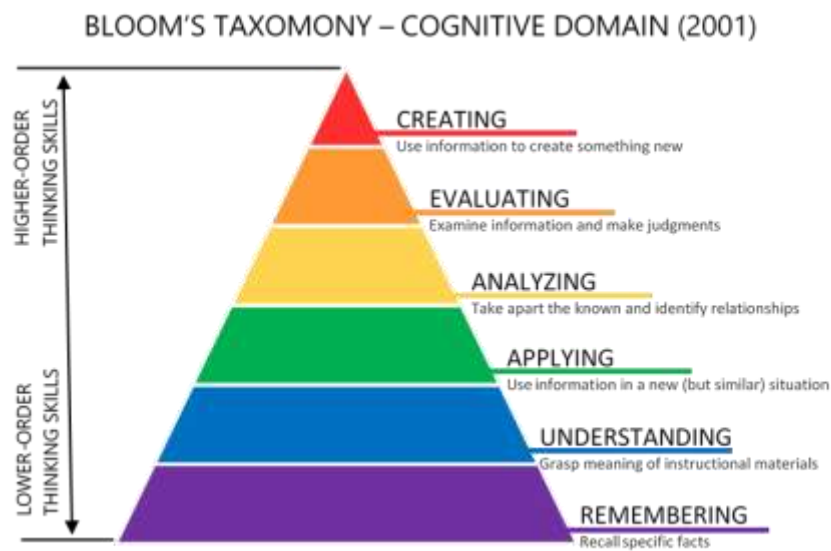
In Cognitivism the main point is focused on how the person processes the information and how they learn especially with the relationship with the memory. In recent years the vision of learning has changed as the student processes information during learning and how he sees his process inside, which leads to seeing how knowledge is acquired beyond instruction, the stages of cognition, and the environment in which learning takes place. Considering that we look for knowledge and knowing as main objectives of learning. Nevertheless, one of the most important aspects in this cognitive approach is related to what the student is able to bring as a new step in the learning process. Therefore, what the student already plans, know and want to learn is essential in the process.

In Bloom's taxonomy (1956), we observe that it comprises learning hierarchies that require levels of thinking and cognitive competence during learning where three components (fields) are proposed: The Cognitive domain, affective domain, and

psychomotor domain. The main part about the cognitive domain we can observe the order of this categorization: knowledge, understanding, application, analysis, synthesis, and evaluation. In 2001, the theory was analyzed again, and a new domain was added: Creation. These cognitive behaviors are the ones that have to be considered at the moment of teaching and what to take into account the curriculum planning.

Figure 2

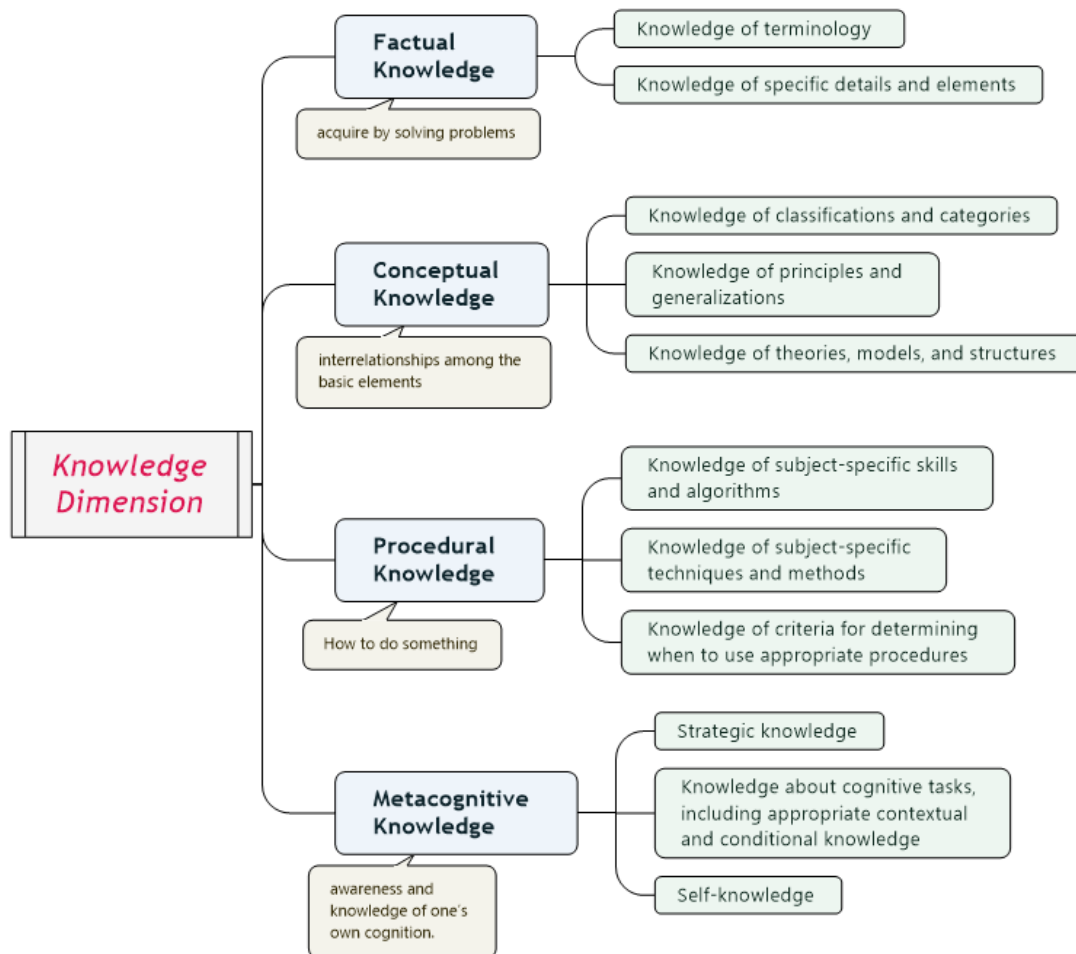
Blooms Taxonomy of Cognitive Domain



Note: The graphic organizer was taken from Krathwohl, D. R. (2002). A revision of Bloom's Taxonomy: An overview. *Theory into Practice*, 4 (Autumn). <https://bit.ly/2Nid2Lw>

Based on Bloom's findings, several authors made a separate distinction between the verb and noun components of Knowledge category where is consider the Knowledge dimension and the Cognitive dimension with their respective taxonomies (Amer 2006). There in the Knowledge dimension we find:

Figure 3
Structure of the Knowledge Dimension



Note: This content was taken from: Amer, A. (2006). Reflections on Bloom's revised taxonomy. *Electronic Journal of Research in Educational Psychology*, 4(1), 218.

Factual, Conceptual, and Procedural Knowledge are considered when developing the work of curriculum planning and classroom work, the focus is always on the development of cognitive, procedural, and attitudinal content, some more consideration than others. However, metacognition is a component that goes unnoticed or lightly touched since it does not project to the student's individualization as to his own participation in his learning. So, it is not known what metacognition is; that is why it is not applied?

1.2. Metacognition

Flavell (1979) said that this can be considered like “knowledge that takes as its object or regulates any aspect of any cognitive endeavor”. It refers to the processes where it is needed to plan, monitor, and assess the way we understand and do a task, in other words thinking about your own thinking process. Baker and Brown (1984) mentioned that it is “an awareness of what skills, strategies, and resources are needed to perform a task effectively; and the ability to use self-regulatory mechanisms to ensure successful completion of a task”. This refers that it allows people to be more aware of how they process information, and also to recognize what are the weaknesses during a task. Consequently, as Bransford, Brown, & Cocking, (2000) mentioned that when students distinguish which are the strong point and faintness, people tend to “actively monitor their learning strategies and resources and assess their readiness for particular tasks and performances”.

It makes emphasis on the type of learning that passes through various knowledge, until arriving, towards its final objective, evidencing that, in this summary there exists a regulation, control and monitoring of what one intends to learn since knowing the understanding of diverse variables, for instance variables of the person, the task; and, variables of strategy. This means that, for learning, it is important to complete the acquisition of knowledge from what has already been obtained through individual control employing techniques and processes that are regulated and separated from the cognitive domains and processes. Flavell (1985) described metacognition like:

skills that are believed to play an important role in many types of cognitive activity, including oral communication of information, oral persuasion, oral comprehension, reading comprehension, writing, language acquisition, perception, attention, memory, problem solving, social cognition, and various forms of self-instruction and self-control. (p. 104).

A crucial part of learning to achieve any knowledge always considers the cognitive strategies, the same ones that seek a particular goal. However, it is the metacognitive strategies that allow us to make sure that the objective could be reached, more than anything else, because the purpose is to review what are the shortcomings presented once the first step gives its results, to rectify and improve (Roberts & Erdos, 1993; Livingston 1997). Therefore, this aspect should be used at the end of a task to evaluate each part and point out aspects to be corrected

In this sense, one of the errors that occur in the area of teaching and training in any field of study is the absence of post-training feedback after a task. The individual who is in the process of training or learning can also be deceived about his own progress, since, when applying knowledge without guidance, he loses the perspective of what he is or what he lacks in his learning process, therefore, there is no understanding or learning (Bjork, 1994). Thus, feedback obtained through a process of monitoring (control), gives better acquisition and retention of knowledge (Pressley and Gathala 1990). In effect, it encourages the use of an analysis that allows one to predict in the future what is expected with learning; with this, possible errors can be corrected. It may be inferred, then, that there should be control of activities that allow for greater depth in the acquisition of skills and knowledge, as long as these are monitored, planned, and analyzed.

Therefore, this feedback necessary in the learning process has a relationship with metacognition because learning refers to a process that allows the memory to work better through steps that would enable us to improve the way we learn daily, considering what was mentioned above regarding how information processing takes place. According to Zimmerman (2000), as students perform a task, they must evaluate it, their level of understanding, through metacognitive processes. In this way, they can modify their learning strategy or the way they carry out a task.

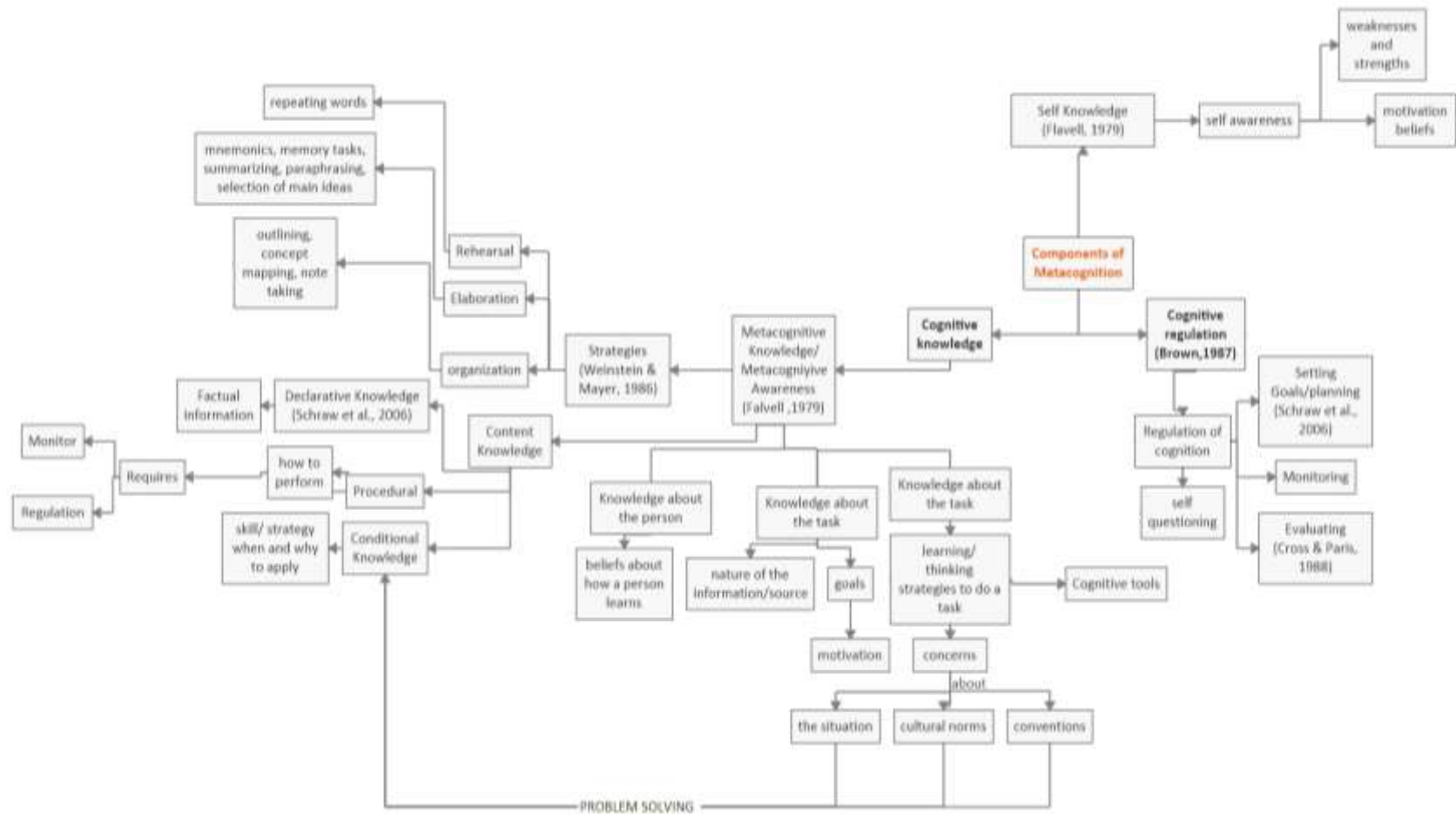
It emphasizes the conceptions that students have about their thinking so that they can solve problems, so it involves doing a better job (Cornoldi, 1998). This leads to the fact that students who are able to use these self-regulation learn to direct their mental process in an orderly fashion into personal goals through the control and the monitor of their learning. Therefore, Kuhn and Dean (2004) mention that through metacognition the student can use a strategy to solve a problem within a given context, and in this process be able to use that strategy for other contexts.

There are two aspects to consider in metacognition, it makes a distinction between the role played by cognition and metacognition, especially the approach, which is to recognize that this is useful to comprehend how a commission can be executed, and in this process that understanding, acquisition, retention, and better application of knowledge provides more efficient learning, able to help solve complex problems and creating a better ability to develop critical thinking skills in whatever the task (Schraw, 2001).

According to Bransonford, Shewood, Vye and Rieser (1986) the use of metacognition has an important impact on thinking and problem-solving, in some experiences, studies presented result where students that have a high achieving success are the ones that use more metacognition than the ones who don't (Sternberg, 1986). This can lead to the fact that the more we use metacognitive strategies, the more the students can reach high thinking level skills.

Flavell, Brown, Mayer, and other authors agree that there are features to consider in metacognition, which are related to aspects and strategies to acquire an awareness of what you are learning. The following graph shows the different aspects studied and found in metacognition in terms of aspects, conditions, and strategies:

Figure 4
Aspects, componets and Strategies of Metacognition



Note: The graphic organizer summarizes the most relevant points related to aspects, components and strategies from various authors exposed through time about metacognition.

Aspects

- a. **Metacognitive Awareness.** -It is understood as self-regulating in the learning process to transfer the skills learned and acquired in class to apply them to other contexts. Therefore, these have a high impact on the student's intellectual development, either within or outside of academic activities. The central internal system is modified in both the cognitive and affective parts. For this reason, the teacher must develop metacognitive knowledge skills, which requires greater demand on the teacher until the student masters the strategies.
- b. **Metacognitive Knowledge:** It is understood that the student must master specific knowledge on some aspects and possess cognitive skills (which have already been developed at each stage). These are the bases that will promote and build a better regulation. It is here where it is necessary to explain to the student about the conditional knowledge and to produce an atmosphere that encourages the use of regulation and monitoring.

Components of Metacognition

Knowledge of Cognition

This component refers to what each individual has knowledge or knows about his own cognition, that is, about how he manages to know things and about cognition (as a process) in general. It includes these types of metacognitive consciousness:

Declarative Knowledge: this deals with the knowledge of oneself as a student, which refers to the knowledge obtained through experience (the knowing that) in itself in general is the knowledge of things, and which factors can influence some task's execution. Even, one can determine which are the limitations or about the different aspects of oneself as a learner. Besides, this implies that the person is aware of what skills they possess in relation to the strategies they know.

Procedural Knowledge: This mentions to the type of acquaintance of how to do, develop, and execute a task. This implies how to use the strategies and the knowledge that one has of those to know which to apply depending on the context. Some people with a high level of awareness know what type of strategies they conscious about and can automatically perform a task because they have a wide repertoire of strategies to solve a problem.

Conditional Knowledge: Garner (1990) said that this information states to at what time and wherefore to use the other knowledges (knowing that and knowing how). This means that the student can use the resources and strategies better and adjust to changes in the task's demands and achieve better learning.

Regulation of Cognition

This aspect refers to what the student knows and about what he knows on how to do the activities related to his/her learning and the execution and fulfillment of a task. For this, his awareness and knowledge of his own cognition are within a process of control. The learning has its own organization that will be directed by the student's regulation, allowing him to solve problems.

Greeno, Collins, and Resnick, (1996) affirm that learning from the cognitive point of view is not passively influenced by the environment, but that each individual actively participates, reflects, and establishes purposes. This reaffirms that there is an internal regulation towards what one wants to learn, which implies that the one who learns is the active entity. this requires the existence of skills that allow an adequate process of regulation and how to use these skills, which implies that they must be taught, guided until the student can make use of them by himself and achieve management of his own metacognition.

2.1 Regulatory Skills

Schraw & Dennison (1994) describe the following skills as part of regulation: planning, monitoring and evaluating, that require a management of specific strategies so they can be mastered.

- a. **Planning.** - How the student is organized for learning to establish objectives for the activity that is going to be carried out, to see the strategies that can help to develop it, to analyze the available resources and those that could be needed, and to review the achieved results, even considering the time that ought to be spent to carry out an activity.
- b. **Setting goals.** - Part of the planning is also to establish goals and objectives for the tasks to be performed; even these should be established in terms of what we want to learn, so that it is clear what is intended within the learning process, whether it is programmed in the curriculum, by the teacher, by the lesson or by the student responsible for his own learning.
- c. **Monitoring.** - This aspect can be considered a process in which the individual becomes aware of his own cognitive process if there is a learning of what has been established to learn through reflection, observation, control, and judgment of all activities performed in this process. Therefore, the information that is collected through these processes is what allows us to know if it is achieving the proposed objectives, which in this case, is to learn. This stage develops interpersonal intelligence that can be helpful when people are facing situations where they have to solve problems. Students decide the when, how and why to learn any specific point more effectively.

Nelson and Narens (1990, p. 130) did extent research on monitoring and control where they considered the memory as an active part in this process, and they mentioned three sorts of states that help to monitor learning, so information can be used and recalled:

- a. **Ease-of-learning:** Here we consider predictions about what you will learn and how you will evaluate your level of difficulty or the opposite, including what strategies would help you solve it.
- b. **Judgments of learning:** These are established during or when a task is finished, exam, etc., to control if what is proposed is correct or incorrect and to recognize what was not done properly and thus be able to anticipate future tasks.
- c. **Feeling-of-knowing:** refers to whether the objective to be learned, after going through the other aspects, can be reiterated or whether it can be brought up if necessary, at a required time

Self-monitoring: according to Ellis and Zimmerman (2001) this is a process that helps us direct our attention in a better way, helping us be more aware of what we are doing and allowing us to develop metacognition in terms of our cognitive and behavioral part. This, in addition to providing good feedback on the achievements and objectives accomplished, helping obtain greater satisfaction with the results, and adjust the performance.

Evaluating. - This aspect collects and analyzes the product of the objectives initially set by the learner, and with this seeks to make value judgments on what is executed by itself in terms of what has been learned or what is thought to be known, or what can be done. This process allows us to see if everything done during the regulation process was adequate and to be able to modify what has not yet been achieved. This requires a process of reasoning, a sense of assessment to recognize what went wrong and what is needed to revise.

Metacognitive Strategies

The Metacognitive Awareness Inventory (MAI)

It was established by Schraw and Dennison in 1994. It was created to make students feel, have, and develop a sense of awareness, and through the use of 52 questions, it works on over the following aspects:

- a. **“Knowledge of Cognition** (Declarative, Procedural, and Conditional): where it is considered:
 - a) Awareness of factors that influence your own learning
 - b) Knowing a collection of strategies to use for learning
 - c) Choosing the appropriate strategy for the specific learning situation
- b. **Regulation of Cognition**
 - a) Setting goals and planning
 - b) Monitoring and controlling learning
 - c) Evaluating own regulation (Schraw & Dennison, 1994)”

The main purpose of this tool is to help students improve their knowledge and better regulate their learning.

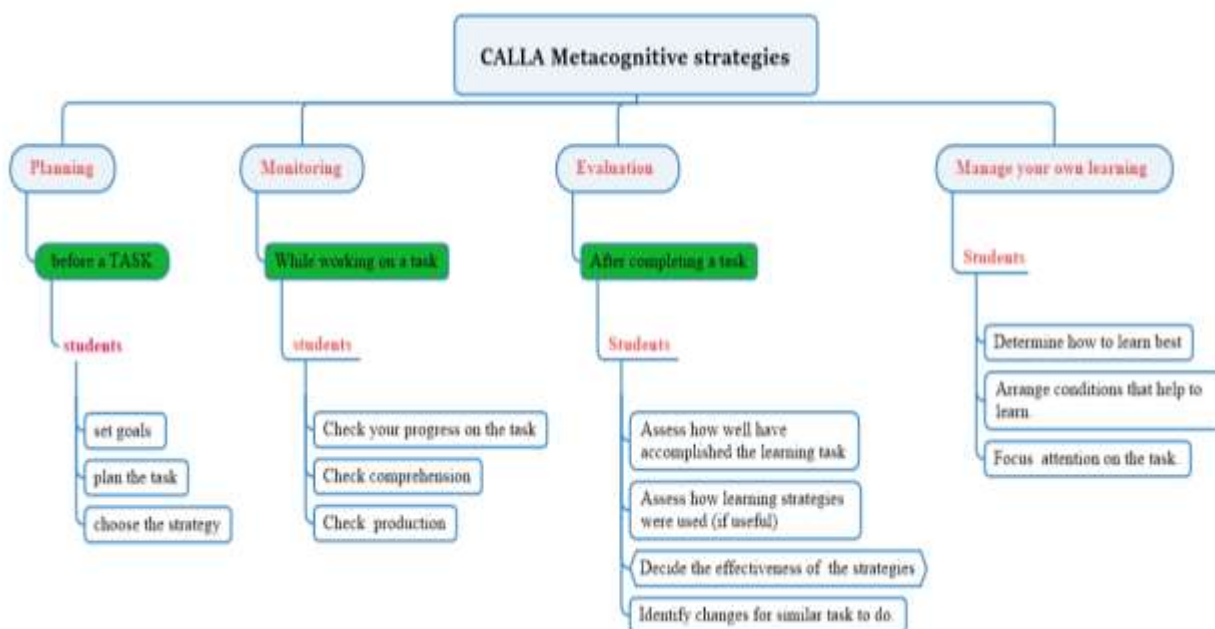
The Cognitive Academic Learning Approach (CALLA)

Referring to teaching a foreign language CALLA seeks to develop the learning of a second language considering the aspects presented in the cognitive theory. With the idea of providing help to students in their academic performance, they seek to create independent users who can regulate themselves through the different strategies they receive in the classroom. The main objectives of CALLA are:

- “Learning the content knowledge and the language skills that are most important
- for their future academic success;
- Evaluating their own learning and planning how to become more effective and independent learners” (Chamot, 1990)

Among other objectives, the ones mentioned before are specifically related to metacognition and consider the following strategies:

Figure 5
Cognitive Academic Learning Approach (CALLA)



Note: This content was taken from: Chamot, A. U., & Robbins, J. (2005, April). The CALLA Model: Strategies for ELL student success. *In Workshop for Region* (Vol. 10).

Planning

a. Pre-assessment (Self-questioning)

This point permits the student to take a well perspective and motivates the student to analyze what exactly he/she knows and how he/she thinks (Vancouver Island University [VIU], 2017). Here the student can analyze what his strengths and weaknesses are in the subject being reviewed and his own way of thinking.

The idea is, to be honest about what is really known about a subject through Skimming, Categorizing and Summarizing. This activity can be led at the beginning with the complete group so it can be understood and process to carry out individually.

a. Self-Assessment (VIU, 2017)

According to Vancouver Island University [VIU], 2017 self- assessment (**Self-Regulated Learning Skills**) Students can ask themselves through small tests about how they think and how they learn. The purpose is that from the beginning of the learning process, they can consider all the experiences they have already had to visualize the most effective ones and when to use them.

It could be useful to apply and consider some statements (ASSIST) which is a type of test, where the student can assess what he considers important about his own way of learning.

Monitoring**a. Think Aloud(s)**

It is usually related and applied to reading, however it can be applied to other areas. It allows you to monitor the way you think and improve your understanding of the topic to be studied. The strategy is quite useful for those who study a second language and at the same time are looking at specific content, but it is the teacher who must first model the strategy so that it is understood and applied.

The strategy requires the next steps, and questions or clues that guide the procedure:

Example:

Table 1
Think aloud Checklist

Think aloud Checklist	
STRATEGY	USEFUL QUESTIONS/ CUES
Prediction	Here the student can make a prediction about what is the content about (I think this is), or what can happen next (I predict)
Questions	In this step, students have to create questions while they are getting information (Why / what/ how /where did)
Visualization	At this point, the student can describe what he already discovered (I see / picture)
Response (personal answers)	At this point the students got enough facts from the topic, and they can share are the most interesting points about it (my favorite part is/ I liked; I didn't like)
Clarification	In this step, students can make clear some points that they think is difficult or not sure (I think this is confusing)
Summary	As soon as they have all the aspects clear and know what the topic is, they can make a summary, highlighting the main important aspects (I think the most important idea from the topic/ reading is)
Reflection	At this point, students can reflect about what else can do to deep more into the topic or to solve any aspect mention before the activity (I think / I realized that. I'll... next time)
Make Connections • personal point of view • connections with the text	The last step is to be able to establish connections from the point of view of the person (what he knew) and what he could relate with the new information. (This is similar / I remember this when)

Note: based on activity in Schoenbach, R., Greenleaf, C. L., Cziko, C., Hurwitz, L. (2000). *Reading for Understanding: A Guide to Improving Reading in Middle and High School Classrooms*. San Francisco, CA: Jossey-Bass, 78. Adapted by CAST <http://www.cast.org>.

b. Concept Mapping and Visual Study Tools

Graphic organizers allow representing how the ideas are organized, which are the relationships between concepts and, in a logical way, what is understood or intended to be explained, considering which type of organizer is the most

appropriate for the topic to be explained.

It is a useful tool that outside the classroom allows to monitor what has been read or reviewed, the ability to summarize and organize ideas, facilitating learning, and reorganizing knowledge.

c. The KWL

What I **know** (the topic, the theme, etc.)

What do I **want** to know?

What did I **learn** at the end (of the class)?

The educator needs to show, discuss and show how the strategy works. This can be applied to any type of lesson; however, studies show that it has been tested more in teaching reading or to work in the area of reading. However, it can open a space in any lesson so that the student can differentiate his input and output knowledge, observe how his thinking was modified, and be aware of whether he learned something new and restructured his knowledge of things.

Evaluation

a. Classroom Assessment Tools (CATS) (VIU, 2027)

In the document from Vancouver University, which is a guide to teachers to apply with their student, are mentioned the following strategies that look for assessing learning these activities can be applied as Formative and Summative assessment in a metacognitive form that help students to reinforce knowledge and reflect on the parts that most of the time are nor easily understood or not clear enough:

Table 2
Cats strategies and how to use it

Strategy	What to do	When to Apply it	Type of Assessment
<i>Ticket out the door</i> (about the class)	Ask questions of the class and students answer if they want to leave	End of the class	Formative / Summative
<i>One minute paper</i> (about what they think)	Ask students to write about the most important aspects they learned.	End of the class	Formative / Summative
<i>Muddiest Point</i> (about difficulties)	Students socialize what they found difficult or they didn't understand	End of the class	Summative
<i>Weekly Report</i>	Students summarize in a report what they learned/ did / and found out about the class.	During classes End of a lesson End of a unit End of a partial	Formative / Summative

Note: taken from: Vancouver Island University [VIU] (2017). *VIU Teaching and Learning Handbook*.
[/https://ciel.viu.ca/sites/default/files/web-aug-17-viu-new-faculty-handbook-print.pdf](https://ciel.viu.ca/sites/default/files/web-aug-17-viu-new-faculty-handbook-print.pdf)

b. Note Taking (metacognitive note taking)

c.

This strategy allows to better guide how the information to be studied is received, allowing the student to concentrate, understand better, and have better retention. It can be suggested to the students that this activity is carried out in phases: before, during, and after class. Emphasizing that it is essentially helpful to do it manually, since writing by hand exercises the hand brains work, exercises the working memory, and require the student to think about what is being written.

It is important to do this activity before starting the academic activity. The student needs to know his syllabus to take before the class and rely on the notes to make and guide what he will need to write down. For this, there are several techniques and ways of taking notes, which implies that the student will choose according to their way of learning, so we have:

The Cornell Method, The Mapping, The Outlining method, The Charting method, among others. These methods should be explained according to the topics to be reviewed or guided by the teacher so that the student can choose what best suits his learning style, and above all, what is most useful for him at the time of learning, considering that his notes will be of help when facing more complex work and support for his exams.

d. Wrappers

This activity focuses on developing self-monitoring of the activities performed, whether it is a lesson, homework, project, or how a test was performed. It seeks to see what difficulties and shortcomings were found during the activity and see why the objectives were not achieved.

The points that are considered within a test to review what was or was not accomplished can be determined within these aspects:

Preparation: in terms of preparation for the activity (how much time did you put into the activity, what resources did you use?)

Planification: It is considered how it was prepared, for how long (strategies used in class, own strategies, group work).

Performance: Here we consider the work results (grade obtained) and whether this is under what was proposed or planned for itself and considers what the student feels about their results and what points are what failed and need to be improved.

Next Step: At this point, it is considered what the student will be to improve in the next job and reach his own objectives.

The idea with the strategies is to create in the student a broad vision of what to do in front of the different activities that must be accomplished and above all to learn, which leads him to focus on using strategies that help him to perform adequately and to achieve self-regulation through the processes described above, highlighting the use of

monitoring and self-evaluation in a more organized way to solve all kinds of problems. Therefore, to achieve that, metamemory and metacomprehension can make adjustments through feedback to their own learning process. As a result, a more organized way of thinking will be obtained, and critical thinking will be developed in turn.

Critical Thinking (CT)

John Dewey was the precursor of the CT. He mentioned that analysis is required in the way we think; he described it as reflection. He illusioned how thought should be structured and how it should be examined to meet the conditions of acceptance. Thinking is established as an action where the interpretations of facts in the present are related to previous understandings, and these, in turn, induce reliability to the former. It mentions reflective thinking due to a thought process that was filtered and thought through in an order and sequence, generating results that merge with others and form new thoughts opposite to casual thinking. For Dewey (1910), the process of reflection involves sub-processes such as perplexity, hesitation, doubt, and analysis through the search for information to verify or discard beliefs.

Since the 1930s, it has been considered an educational objective, and over the years, its conception has been refined, in this case. For example, Bloom (1956) is worth mentioning who, with his taxonomy, proceeds to include critical thinking skills. However, it would not be until Ennis (1962) established 12 aspects to be considered in his research for the educational field and how it should be evaluated concerning CT.

As is said by Paul, and Elder, (2003) "Critical thinking is the art of analyzing and evaluating thinking with a view to improving it". It is also mentioned that:

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It requires rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities and a commitment to overcoming our native egocentrism and sociocentrism" (page 2).

Moreover, the fact that considering having these generic skills, other factors also help to grow CT. That is the case of some dispositions and attitudes which will benefit to blossom the conditions to create, improve, or refine the CT you have, as can be seen in this table:

Table 3

Conditions to create Critical Thinking

DISPOSITIONS / ATTITUDES	ASPECTS
Willingness to Plan Prescriptive descriptions about what to do (Habit of planning)	• Learn to check impulsivity • Plan to response: (requires) - Outlining - Diagramming • Plan how you think and act (regardless of the content)
Flexibility (open-minded)	• Desire to do a task • Engage in a thoughtful task • Attitude (persistence)
Willingness to Self-correct. (Admit Errors)	• Good thinkers acknowledge errors. • Disposition to be self-critical (evaluative) • Avoid self-justification (excuses) • Recieve positively an evaluation • Willingness to shift
Being Mindful	• Be aware of the task and engage with it • Avoid responding in a routinized way (mindless)
Consensus – Seeking (Openness in thinking)	• Predisposition to accept and consider ideas from others. • High level of communication skills (allow other people and yourself express doubts to achieve a solution)

Note: taken from: Halpern, D. F. (2013). *Thought and knowledge: An introduction to critical thinking*. Psychology Press.

These aspects and arrangements are important when considering the dimensions involved in critical thinking skills. Therefore, they should be regarded as when working in the classroom or for any purpose as part of the CT skills.

1.3. Critical thinking skills

There is a consensual definition of what CT is, and what skills and subskills a person has to considered in possessing critical thinking. Halpern (2014) also explains related to this, that some skills in Critical thinking are connected to being purposeful, reasoned, capacity of solving problems, formulate inferences, calculating probabilities, and make decisions. In fact, CT involves examining how the thinking process takes place, the reasons why that conclusion was reached, and the factors that cause it to make individual decisions. Facione, (1990) mentioned what are the Skills and Sub-skills in Critical Thinking, which were discussed in a group of experts in the Delphi Report, According to the committee's decision are:

Interpretation: which means comprehend and being able to express the meaning of different procedure or criteria

Subskills of Interpretation:

- **Categorization:** formulate categories characterize information
- **Decoding Significance:** detect, attend to and describe information
- **Clarifying Meaning:** describe, paraphrase

Analysis: identify the inferential intentions in general.

Subskills of Analysis:

- **Examining ideas:** determine intentions in an argument, define terms, contrast ideas, and identify problems.
- **Detecting arguments:** determine things set.
- **Analysing arguments:** identify and differentiate conclusion, reasons (premises), reasons intended, check presuppositions, structure of the argument.

Evaluation: assess credibility and logical and intended inferential relationships.

Subskills of Evaluation:

- **Assessing Claims:** recognizing factors to assess relevance, credibility, and acceptability.

- **Assessing Arguments:** determine and judge weak and strong arguments.

Inference: draw conclusions, conjectures and hypothesis.

Subskills of Inference:

- **Querying evidence:** seek and gather information to support an idea (in particular). To judge information (in general)
- **Conjecturing Alternatives:** solve a problem through alternative hypothesis. Project possible consequences.
- **Drawing conclusions:** explain inferential relationship and consequences they support.

Explanation: declare results in a structure form.

Subskills of Explanation:

- **Stating Results:** give an accurate description from an activity to show results.
- **Justify Procedures:** present evidence and other considerations for review to justify methodologies to explain a precedent.
- **Presenting Arguments:** present rationale and provide judgment by showing evidence and analysis.

Self-Regulation: monitor and be aware of the activities being performed and be able to correct any errors found.

Subskills of Self – Regulation:

- **Self- examination:** using metacognition to reflect on how one thinks and the use of cognitive skills
- **Self- correction:** correcting problems once self-reflection has been done in an activity.
-

The most used education skills are clearly related to analysis, deduction, and inference to a lesser degree. The other aspects mentioned in the experts' report list are unknown, and therefore, not developed. This implies that it is necessary to work equally

on the CT skills and sub-skills within the classroom to say that this area is really being developed.

In the research work *Critical Thinking and Intelligence Analysis*, Moore (2007) explains two parts needed in CT. The first one is related to the metacognitive part (thinking about thinking) and the cognitive part; the second is how a person reaches a particular conclusion, but in the process, he improves or corrects the reasons for his argument. In other words, who observes a process requires skills to achieve a conclusion and a purification of the information through stages that can give a quality result or a product. This means as the six points in the skills, that self-regulation, which is metacognition, help to build a better thinking process when CT is required and other abilities to have a good argument and validate what you are defending.

It is also mentioned that there are critical thinking abilities that a thinker has to show as Ennis mentioned, which are:

Analysis of arguments, clarify questions (ask and answer), use graphs (understand), Judge the credibility of a source and reports, established conclusions, deduce, and judge deductions, make, and judge, inductive inferences and arguments (both enumerative induction and best-explanation reasoning), make, and judge, value judgments, define terms, and judge definitions, handle equivocation appropriately, attribute and judge unstated assumptions, think suppositionally, and deal with fallacy labels. be aware of, and check the quality of, their own thinking (metacognition) (Ennis, 2015).

The most important thing in terms of CT is that once you have a goal, all the activities to reach it (cognitive skills and strategies) help achieve what is proposed. For this reason, if the skills are developed in an adequate, prolonged, and reinforced manner in the different areas, students can become better thinkers. Still, above all, they have the ability to solve the different problems that arise in life and society more consciously.

CHAPTER II. DESIGN METHODOLOGY

2.1. Research approach, Research Scope

The present study is quasi-experimental since it is in total control of one variable, which is the independent variable, which within the research topic is Metacognition, and with this, to be able to measure the effects of this on the second variable. Besides, a pretest and post-test are used with the groups initially and at the end of the period established for the research, respecting the population's distribution. The parallels are already formed before carrying out the research are not organized randomly.

The approach is quantitative, which according to Hernández, Fernández, and Baptista (2010), is sequential and evidential, i.e., which attentions on gathering mathematical information and generalizing to explain a certain singularity (Muijs, D., 2010). It has a gradual and rigorous order and seeks to explain the theory deductively so that its results can be generalized. Starting from a certain idea, which is the use of metacognitive strategies, we proceed to review the literature on metacognition and its strategies, thus having different aspects on the subject, raising a hypothesis or idea to be tested, for which data are collected, which are analyzed through statistical analysis to establish behavioral models, and check the idea put forward.

The coverage of this study is correlational due to it pursues to identify the relationship and the degree of association that exists between variables within a context and to forecast the value of a variable from the value of another related variable so that the phenomenon studied can be explained even if only partially. To do this, variables are identified, and hypotheses are established, and then each variable is measured; and thus, the linkage between variables is analyzed. With the result of these data, the hypothesis can be tested or not.

Population and sample

A nonprobability sampling is applied due to the entire population is 50 students in total from the fourth levels of the school of languages and Linguistics of PUCESA (English Courses: Regular and Open), it means a that a convenience sampling was used

Methodological procedure

A total of 50 students participated in the research. The control group consisted of 28 people, of which 64% were women and 36% men, in the control group the age range of 17-19 years represented 79%, the age range of 20- 22 represented 14% and the age range of 23-25 participated with 7%. Regarding the experimental group, it was made up of 22 people, of which 59% were men and 41% women, in the experimental group the age range of 17-19 years represented 77%, 20-22 years represented the 18% and finally the age group of 23-25 years participated with 5%.

1. Once the instruments for the pretest stage were applied, we proceeded to work with the control group using the metacognitive strategies. For the beginning, we gave them self-regulation tests to the control group and the experimental group as the standardized test, which allowed an individual recognition that, as each student sees his own learning, and how he processes information, by way of self-evaluation, they reviewed their level of knowledge and mastery of strategies for learning.
2. This was included in the platform. Keeping a journal was part of the self-regulation where students took notes of what they needed, what they were not doing, and they can be improved, as can be seen on the examples:

Keeping a journal

Choose the options (1–5) which work best for you. Then try keeping a journal for a month.



1. type of journal: notebook / computer-based / online blog
2. entries: every day / after every class / every week
3. type of entry: notes / a narrative / analytical
4. focus: what I learn / how I learn / strong points / weak points
5. reread: after each entry / every week / every two weeks

INSTRUCTIONS ▲

Mistakes

Making mistakes is part of learning. Thinking about mistakes in different categories can help you.

Look at these types of mistakes. Try to write down an example of each kind of mistake.

- Mistakes you make because you haven't learned the correct word or structure yet
- Mistakes that are common to all learners with the same first language as you
- Mistakes that are "yours"—things you personally have problems with
- Mistakes that mean people can't understand your message properly

Note: taken from: Self-regulation process from the platform

3. Once their skills and weaknesses were identified, students were asked to set goals for the semester and each unit start in a journal. We proceeded to work with the control group in which we first decided to apply the monitoring strategies. In this case, we used the **know-want-learn tables (KWL)**.

Variation: These tables are usually used for reading in pre-reading, reading, and post-reading processes; however, we used the tables differently at the beginning of each lesson to indicate and teach aspects of grammar, vocabulary, and concerning the unit's theme.

The importance of self-regulation of self-knowledge about their learning was explained to the students, for which the students were first asked to plan and organize what the objectives they have in the short and long term during the semester both in the subject

and in the individual part are and when reviewing the text, the importance of self-evaluation and self-recognition of skills and strategies that are practical for learning had to be explained.

In the first instance, we used the monitoring strategies and the Table. The students were asked to **predict** the topics covered, including grammar and vocabulary belonging to each unit. This allowed creating greater awareness of what is going to be learned and the processes to be performed being the mechanical part in terms of teaching and learning process especially avoiding only receiving classes and being a passive entity during class time—developing a better metacognitive vision in the classroom.

When using the tables, the students were asked to make predictions about their knowledge in each of the topics. In the KWL table, a modification was made to ask students to establish their **purpose** within the unit, and what they were asked to focus on what they wanted to learn individually. In addition to the objectives set by the teacher, they were also asked to establish their purposes.

The next variation that was made within the Table was to ask the students to work autonomously, which was a free choice, that is to choose their strategy in which they can learn, practice, and perform reinforcement activities in the topics seen in class and this case write down how they know better and which of the strategies received or perhaps their own are the ones they are doing to complement what they did not understand in the unit, with this the students sought approach with which they feel more confident to learn or to perform any work.

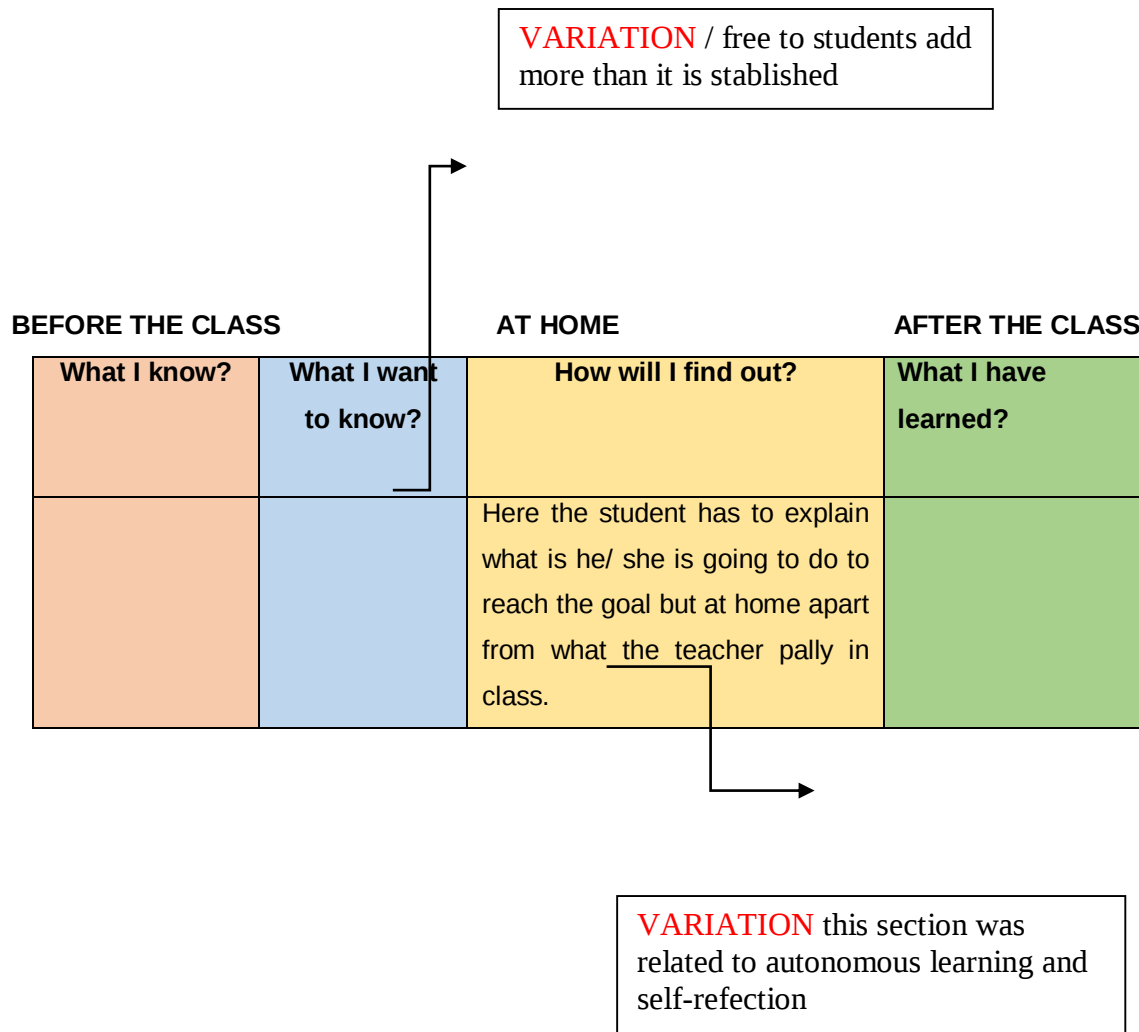
In each unit lesson, KWL Charts were applied, where students were allowed to use their own strategies for learning and practicing the language, both those received in class and those they found useful and were asked to record them in the KW charts. The students are used to the mechanical process of opening the text, listening to the lecture, seeing new words, answering exercises from the text, some extra practice, but with no specific purpose and without counteracting what they already knew about the

subject and the grammar to be seen. The idea was that the student at the beginning of the lesson mentions what he knows about what he will learn **(KNOW)**. Once he has established his strengths and weaknesses in terms of his declarative knowledge, he sets his own objectives concerning what he will learn **(WANT)**. Finally, once the lesson is over, he values what he learned and added as new to what he stated at the beginning **(LEARN)**. In this way, the student evaluates if the learning was significant with his own training and interests, example:

Normal KW CHART, use for reading

K (know)	W (want)	L (learn)
The student writes about what he/she knows about the topic	Here establishes his/her own goals	Analyze what he / she learn (new) and if everything was according to the expectative established.

There are variations where educators include an extra section, where it describes what the student contributes to reach his or her objective, and it is in this section where it describes what activities the student does to improve and learn, example:



4. By recording what they learned and what they remembered having previously reviewed, students developed their zone of approximation, connecting real, reasoned, and related learning, considering not only graphical content, but analyzing aspects seen within the topic, with greater precision in the answers that required interpretation, observation, and analysis. This and adaptation done by Bailey, L. A. (2017).

With this, a reflection was made on what they learned at the end, i.e., the beginning of the process and the end of the lesson as a complement for this phase. For this phase

of **planning and monitoring**, the **THINK-ALoud STRATEGY** was used, emphasizing the stages of 1. prediction on the topic being reviewed, i.e., the ideas that one has in advance, as well as 2. the creation of questions about what was reviewed and doubts that one has in general, and with 3. the visualization stage, experiences are discovered and shared, having several points of view on what the essential points were.

At the end of this process of clarification where everything previously reviewed was analyzed in a group way and then individually in stages of summary and reflection because in this stage doubts about the not understood parts of the revised topic were solved during the class hour, which allowed to create connections between what was already known previously about the subject and connections were made with the new information, that is to say, an analysis of similarity points was created creating their own judgment about the content to be reviewed.

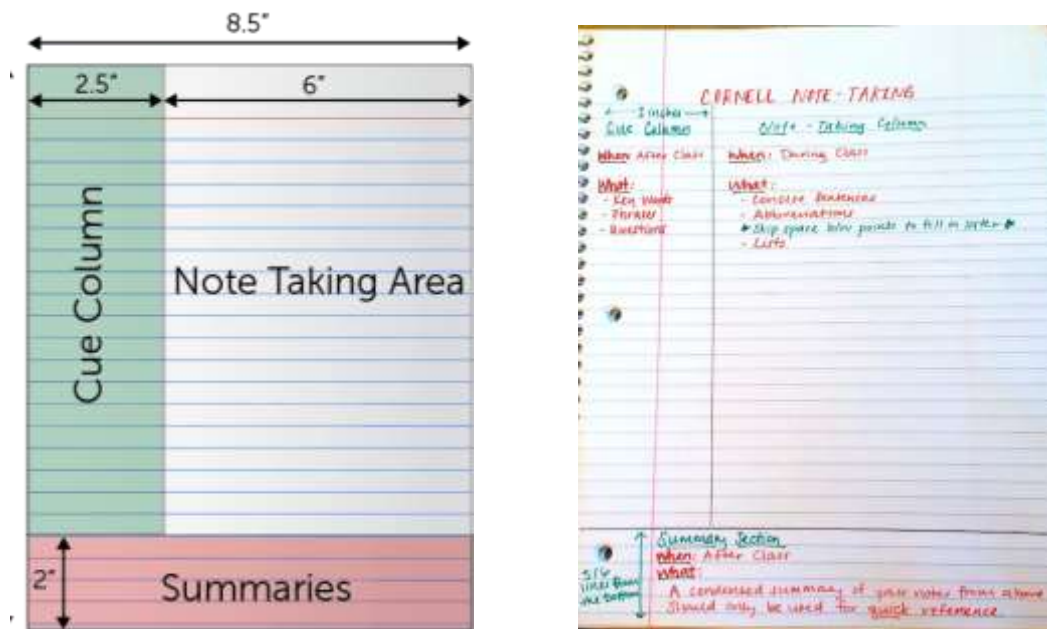
Considering that the text used in the classroom contains parts:

- A and B where grammar and vocabulary are taught
- Part C, which has reading
- Part D where speaking is practiced
- Part E where writing is practiced.

Parts A, B, D, and E were developed with this strategy which helped to develop the theme specially to deal with grammar and vocabulary. For part B of the text, **CONCEPT MAPPING**, and **VISUAL STRATEGY TOOLS** were applied at the end of reading So that students learn to summarize, organize, analyze, and connect their own ideas about the text., through the use of **graphic organizers** according to the reading.

The students were allowed to use **NOTE-TAKING**, in this case, *metacognitive note-taking*, which was generated at the beginning using formats such as the Cornell method that contains a cue part for key words and questions and prompts. Note column to summarize and concepts of each class, making each student manage step by step how to take notes and how to use them for the different activities, after the process was

guided it was done freely and individually, allowing creativity in the format that was assigned in the summary section, where they reflected on what they reviewed

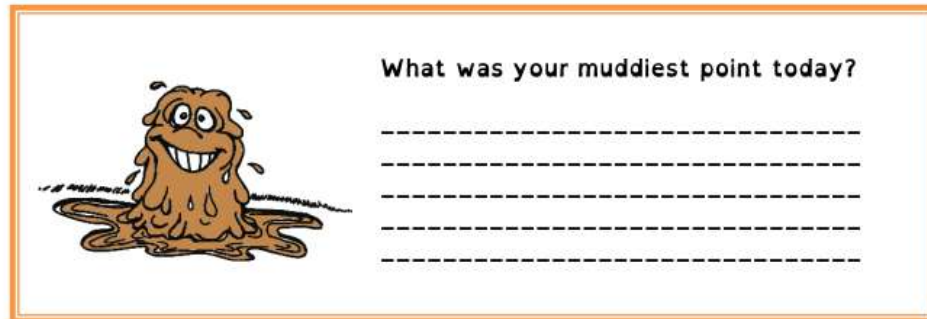


Note: taken from the students and done by the teacher

During the classes, Classroom Assessment Tools (CATS) were applied, considering that the work was done virtually, the first strategy applied was Ticket out the door and One minute paper were used to motivate the students to actively participate in the feedback, without it being directly visualized, helping them to make a self-evaluation and summary of the content received. At the end of classes and each week, the Muddiest Point and Weekly Report were applied to reinforce revised changes, the teacher asks student, at the end of the teaching session, to write down (in a piece of paper) the answer to the question "what was the muddiest point/most confusing point addressed today?" or any similar question (Angelo and Cross, 1993) to work on the feedback.

This was done in the chat box from teams. Students' feedback checked to handle the problem (in a handout next session, an e-mail to clarify the confusing point, or

recapping the confusing points at the start of next session, repeating the whole session if there are many confusing points or even revise course content) (Mosteller, 1989).



It helped a lot to check what was working or what was not working in the classroom, it provided a snapshot of student's comprehension and the effectiveness in the learning process, but this was done by students who did not realize that they were evaluated, and they also were self- evaluating themselves, had the opportunity to check if they were learning or not, and even could consider others.

With CATS, students analyze why some aspects were done or applied in a certain way, and even they proposed some suggestions on how to improve, creating a positive, active student's center environment. For the exams of each partial, **WRAPPERS** that were completed before and after each process were used to observe which activities were not done or which could be improved to obtain a better result in each exam, achieving monitoring, evaluation, and planning for individual preparation and achieving favorable results. This was part of the mandatory tutorials to check the exams

EXAM WRAPPER

Name:	Exam:
Exam date:	Score:

When did you start preparing for the exam? (Choose one option)

- (A) I have been regularly revising since the start of the year
- (B) About 2 weeks before the exam
- (C) About 1 week before the exam
- (D) The night before the exam
- (E) I didn't prepare

How did you prepare for the exam? Circle the strategies you used to prepare for the exam.

Read notes	Created own notes	Completed chapter review questions	Completed online quizzes
Studied with a friend or group	Created flash cards	Asked someone to test you	Other: _____

What types of questions were the most challenging for you? Why?

Type of question	Why did I find this question challenging?
Eg. Drawing graphs	I don't know when to draw a column graph and when to draw a line graph.

Name 3 things you will do differently for your next exam. • _____ • _____ • _____	How can the teacher help you with the next exam? • _____ • _____ • _____
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Note: taken from Moodle platform done by the teacher

The 1-minute paper strategy was applied through the chat, where students were able to express their opinions on the topics reviewed, especially for parts C and E of the text that involve reading and writing, correcting errors, and filling gaps, this in conjunction with the Muddiest point strategy, which helped to clarify doubts and difficulties that were

not understood as general and individual feedback, since the written comments in the chat, served to help students who still had gaps or problems.

MINUTE PAPER

Please answer these questions using sentences

What are you hoping to learn today?

What did you learn today?

What do you need to learn more about?

Note: taken from Moodle platform done by the teacher

For the Third partial, the students elaborated their project as part of the summative evaluation within the syllabus. The activity was guided through the use of Wrappers where they were made to monitor the preparation, planning, and execution of the project, helping this process to develop a meta-comprehension of the work done, where the student evaluated their performance and measured their results, obtaining a grade for this process, which was never carried out in a controlled manner previously. Students improve their perception about what they need to change to reach their goals.

Choose the options you think are correct.

2. What should you do to prepare for an exam?

- ☐ do some practice papers
- ☐ go on vacation to an English-speaking country
- ☐ look through your notebook

Note: taken from **Moodle** platform done by the teacher

Questionnaires

The Metacognitive Awareness Inventory (MAI)

MAI was established by Schraw, G. and Dennison, R. S., was created to check “Knowledge of Cognition Factor” and “Regulation of Cognition Factor” respectively). It has of 52 questions that cover these two components (Schraw, G. & Dennison, R.S. ,1994), so this instrument measures metacognitive awareness. It is helpful to analyze the relationship between metacognitive skills and specific academic skills related to classwork, tests, general tasks in class (readings, listening, etc.)

Table 4

Aspects consider in MAI

DIMENSIONS	SUB DIMENSIONS
Knowledge of Cognitive Processes	Indicative (Declarative) K. Practical (Procedural) K. Provisional (Conditional) K.
	Planning
Regulation of Cognition	Information Management Strategies Comprehension Monitoring Debugging Strategies Evaluation

Note: Taken from Schraw, G. and Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.

The Cornell Critical Thinking Test Level Z Fifth Edition (for high school students)

This test was created by Robert H. Ennis, Jason Millman, and Thomas N. Tomko, it can be used for high school, college, and adults (in general. This test is concerned not only with CT but also with CT instruction and curriculum development (Ennis, Millman, & Tomko, (2005); it is also used as teaching material. some dimensions. It has a general content from everyday life experiences. It has a multiple-choice test.

Table 5

Aspects consider in Cornells's Critical Thinking Test

Aspects of CT	Items of level Z
Induction	Items from 1 to 52
Deduction	Items from 1 to 52
Value Judging	<i>Not directly tested</i>
Observation	Items from 1 to 52
Credibility	Items from 1 to 52
Assumptions	Items from 1 to 52
Meaning	Items from 1 to 52
Dispositions	<i>Not directly tested</i>

Note: Ennis, R. H., Millman, J., & Tomko, T. N. (2005). The Cornell Critical Thinking Tests, Level X and Z, revised. *Pacific Grove, California: Midwest Publication.*

Operationalization of the variables

Table 6

Operationalization of the variable Metacognition

VARIABLE	DIMENSIONS	SUB DIMENSIONS	INDICATOR	ITEM
Metacognition for Flavell (1979) said that this can be considered like “knowledge that takes as its object or regulates any aspect of any cognitive endeavour”. It refers to the processes where it is needed to plan, monitor, and assess the way we understand and do a task, in other words thinking about your own thinking process Considering the Knowledge of Cognitive Processes Regulation of Cognition	Knowledge of Cognitive Processes	Declarative Knowledge	• The factual knowledge the learner needs before being able to process or use critical thinking related to the topic • Knowing about, what, or that	3, 14, 27, 33
		Procedural Knowledge	• The application of knowledge for the purposes of completing • a procedure or process • Knowledge about how to implement learning procedures (e.g., strategies)	5, 10, 12, 16, 17, 20, 32, 46.
		Conditional Knowledge	• The determination under what circumstances specific • processes or skills should transfer • Knowledge about when and why to use learning procedures	15, 18, 26, 29, 35
	Regulation of Cognition	Planning	• Planning, goal setting, and allocating resources prior to learning	4, 6, 8, 22, 23, 42, 45
		Information Management Strategies	• Skills and strategy sequences used to process information more efficiently (e.g., organizing, elaborating, summarizing, selective focusing)	9,13,30,31,37,39,41, 43, 47, 48
		Comprehension Monitoring	• Assessment of one’s learning or strategy use	1,2, 11, 21, 28, 34, 49
		Debugging Strategies	• Strategies to correct comprehension and performance errors	25, 40, 44, 51, 52
		Evaluation	- Analysis of performance and strategy effectiveness after a • Learning episode	7, 19, 24 , 36, 38, 50

Note: Taken from Schraw, G. and Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.

Table 7*Cognitive Skills for Critical Thinking*

DIMENSIONS	SUB DIMENSIONS	SUB DIMENSIONS	INDICATOR	ITEM
Cognitive Skills for Critical Thinking	Interpretation (Induction)	To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures or criteria.	• Categorization: formulate categories characterize information • Decoding Significance: detect, attend to and describe information • Clarifying Meaning: describe, paraphrase	17, 26-32
	Analysis (Observation)	To identify the intended and actual inferential relationships among statements, questions, concepts, descriptions or other forms of representation intended to express beliefs, judgments, experiences, reasons, information, or opinions.	• Examining ideas: determine intentions in an argument, define terms, contrast ideas and identify problems. • Detecting arguments: determine things set. • Analysing arguments: identify and differentiate: conclusion, reasons (premises), reasons intended, check presuppositions, structure of the argument.	22- 25
	Evaluation (assumptions)	To assess the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief or opinion; and to assess the logical strength of the actual or intend inferential relationships among statements, descriptions, questions or other forms of representation.	• Assessing Claims: recognizing factors to assess relevance, credibility, and acceptability. • Assessing Arguments: determine and judge weak and strong arguments.	43- 52
	Inference (Deduction)	To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to reduce the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation.	• Querying evidence: seek and gather information to support an idea. (in particular). To judge information (in general) • Conjecturing Alternatives: solve a problem through alternative hypothesis. Project possible consequences. • Drawing conclusions: explain inferential relationship and consequences they support.	1 -10 39-52

	Explanation (meaning)	To state the results of one's reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological and contextual considerations upon which one's results were based; and to present one's reasoning in the form of counterarguments.	• Stating Results: give an accurate description from an activity to show results. • Justify Procedures: present evidence and other considerations for review to justify methodologies to explain a precedent. • Presenting Arguments: present rationale and provide judgment by showing evidence and analysis.	11-21
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Note: Ennis, R. H., Millman, J., & Tomko, T. N. (2005). The Cornell Critical Thinking Tests, Level X and Z, revised. *Pacific Grove, California: Midwest Publication.*

Expert Criterion

In this research, the validation of the instruments that allowed evaluating the relationship between metacognition and critical thinking was carried out through the application of the Delphi Method. The Delphi method is based on the delivery of a questionnaire to a panel of experts in a particular field in which they are asked their opinion on one or more specific topics. The resulting statements are anonymously incorporated into the questionnaire as feedback.

For the Delphi method, the selection of experts is one of the essential stages. A good choice affects the reliability of the results obtained (Aponte Figueroa, Cardozo Montilla, & Melo, 2012). A good selection of experts contributes to putting argued opinions on the analysis, which will probably not be the same on all occasions. However, they allow identifying strengths and weaknesses in the instrument to make adjustments that improve it. The experts' profile for this study included at least one of the following characteristics: Having third-level training in educational sciences in English teaching.

1. Being an expert in topics related to the teaching of English.
2. Having fourth-level training in teaching English.

To carry out the validation of the instruments of this study, the number of experts was determined as follows:

- i. The formula applied to define the number of experts was $\alpha * m$, where α is a number between 0.7 and 1, prefixed by the researcher and m is the number of selected criteria.
- ii. The value of α for the present study was 0.85.
- iii. The number of criteria of the present investigation corresponds to 13, of which 8 correspond to metacognition and 5 to critical thinking.
- iv. By multiplying the value of $\alpha = 0.85$ by 13 criteria, 11 were obtained, which corresponds to the number of experts that were necessary to carry out the validation of the instruments.

Using the criteria mentioned above, contact was established with 11 experts from various institutions, of which 54.55% belonged to public higher education institutions and 45.45% to private institutions. The experts who participated in the study had a bachelor's degree, representing 63.64%, and 36.36% had a fourth-level degree (see table 8).

Table 8

Experts who participated in the validation by the Delphi method

Nro.	Institution to which it belongs	Financing of the institution	Academic degree
1	San Pio X School	Private	Degree in Education Sciences with a major in English
2	Universidad Técnica de Ambato	Public	Degree in Human Sciences and Education, mention in English
3	Universidad Técnica de Ambato	Public	Master in University Education and Educational Administration
4	Universidad Técnica de Ambato	Public	Master in Teaching the English Language
5	Universidad Técnica de Ambato	Public	Degree in Human Sciences and Education, mention in English
6	Pontificia Universidad Católica del Ecuador - Sede Ambato	Private	Magister University teaching
7	Pontificia Universidad Católica del Ecuador - Sede Ambato	Private	Bachelor Degree
8	Manuel Maria Sánchez School	Public	Higher Education Curriculum and Teaching Magister
9	Unidad Educativa Juan Leon Mera La Salle	Private	Bachelor Degree
10	Superior Technological Institute Vicente León	Public	Bachelor of Education Science with a major in English
11	Universidad Tecnológica Indoamérica	Private	Bachelor's degree on Educational Sciences majored in English

Note: Taken from the judgment expert form done by Galarza Alexandra

To select the experts, the experience was evaluated using the following question:
Express the weight you give to theoretical knowledge and practice in the context of the theme of metacognition in critical thinking development (what do you think is more critical: the theoretical knowledge about the subject or the practical knowledge)
From here, the Knowledge or Information Coefficient (Kc) is calculated through the following formula:

$$Kc = n(0,1)$$

Where:

Kc: Knowledge or Information Coefficient

n: Range selected by the expert

Table 9

Knowledge or Information Coefficient (kc)

Expert	Knowledge or Information Coefficient
1	0,7
2	0,7
3	0,8
4	0,5
5	0,7
6	0,5
7	0,7
8	0,7
9	0,7
10	0,9
11	0,7

Note: taken from the expert judgment form

To assess a set of aspects that influence the level of argumentation or justification of the experts, the following are considered:

Table 10

Sources of argumentation or justification

Sources of argumentation or justification	High	Medium	Low
Theoretical analysis carried out by you	0.3	0.2	0.1
Your experience gained	0.5	0.4	0.2
Works by national authors	0.05	0.05	0.05
Works of foreign authors	0.05	0.05	0.05
Your knowledge of the status of the problem abroad	0.05	0.05	0.05
Your intuition	0.05	0.05	0.05

Note: taken from the expert judgment form

The experts who participated in the study obtained in the argumentation aspect, the following results:

The formula used was the following:

$$K_a = \frac{1}{n} (n_1 + n_2 + n_3 + n_4 + n_5 + n_6)$$

Where:

K_a : Coefficient of Argumentation

n_i : Value corresponding to the source of argumentation i (1 to 6)

Table 11

Coefficient of Argumentation (k_a)

Sources of argumentation or justification	Experts										
	1	2	3	4	5	6	7	8	9	10	11
Theoretical analysis carried out by you	0,30	0,28	0,28	0,30	0,29	0,27	0,28	0,30	0,30	0,28	0,30
Your experience gained	0,46	0,45	0,45	0,50	0,50	0,45	0,48	0,47	0,50	0,50	0,49
Works by national authors	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Works of foreign authors	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Your knowledge of the status of the problem abroad	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Your intuition	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Total Coefficient of Argumentation	0,96	0,93	0,93	1,00	0,99	0,92	0,96	0,97	1,00	0,98	0,99

Note: taken from the expert judgment form

The values of the Coefficient of Knowledge (K_c) and the Coefficient of Argumentation (K_a) proceed to obtain the value of the Coefficient of Competence (K), The coefficient (K) was calculated as follows:

$$K = 0.5 (K_c + K_a)$$

Where:

K : Competition Coefficient

K_c : Knowledge Coefficient

K_a : Coefficient of Argumentation

Table 12

Competition Coefficient

Expert	Knowledge or Information Coefficient (Kc)	Coefficient of Argumentation (Ka)	Competition Coefficient(K)
1	0,70	0,96	0,83
2	0,70	0,93	0,82
3	0,80	0,93	0,87
4	0,50	1,00	0,75
5	0,70	0,99	0,85
6	0,50	0,92	0,71
7	0,70	0,96	0,83
8	0,70	0,97	0,84
9	0,70	1,00	0,85
10	0,90	0,98	0,94
11	0,70	0,99	0,85

Note: taken from the expert judgment form

Considering the following parameters, the experts were selected:

0.8 <K <1.0 Competition Coefficient High

0.5 <K <0.8 Average Competency Coefficient

K <0.5 Low Competition Coefficient

The experts who were selected to establish the evaluation of the instrument that relates metacognition with critical thinking were suitable for the activity, since of 11 of them, 9 demonstrated high competence and two a medium competence, which allowed to improve the instrument's reliability.

Table 13

Expert classification by Competition Coefficient (K)

Expert	Competition Coefficient(K)	Classification
1	0,83	High
2	0,82	High
3	0,87	High
4	0,75	Average
5	0,85	High
6	0,71	Average
7	0,83	High
8	0,84	High
9	0,85	High
10	0,94	High
11	0,85	High

Note: taken from the expert judgment form

CHAPTER III. ANALYSIS OF THE RESULTS OF THE RESEARCH

This section of the document presents the results describing the correlation between metacognition and CT. The participants were 50 people, 28 of whom made up the control group and 22 in the experimental group. The 50 study participants were distributed among 27 women (54%) and 23 men (46%). The 17-19 age group represented 56% of the participants (Table 14).

Table 14

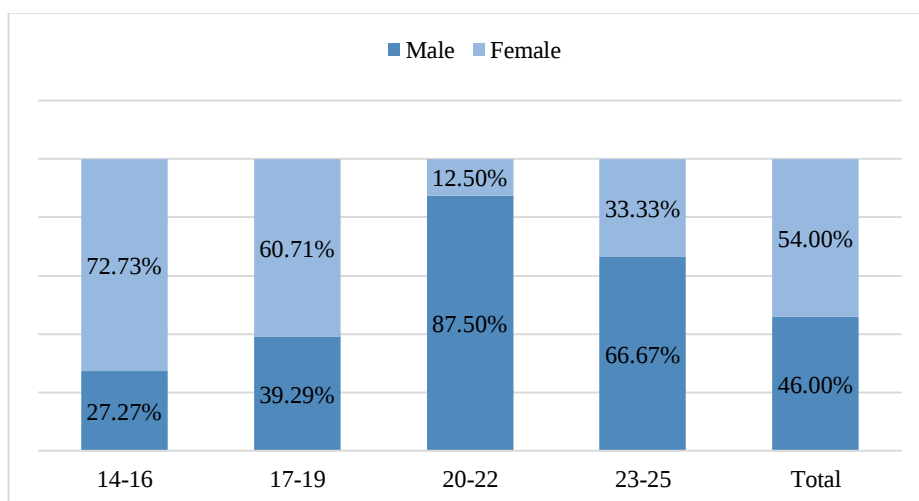
Distribution of participants by gender and age

Age of students	Student gender		Total
	Male	Female	
14-16	3	8	11
17-19	11	17	28
20-22	7	1	8
23-25	2	1	3
Total	23	27	50

Note: This table was taken from the applied instruments

Figure 6

Distribution of participants by gender and age, in percentages



Note: This table was taken from the applied instruments

3.2. Frequency analysis of the dimensions

Results obtained in the evaluation of Metacognition

The results presented compare the control and experimental groups regarding metacognition. It is important to remember that metacognition contains two dimensions, Knowledge of Cognitive Processes and Regulation of Cognition.

An instrument composed of 52 items was applied to assess the dimensions and subdimensions of metacognition (see table 6 and appendix 1). The recording of responses for each item used a Likert scale where:

- 1= I NEVER do this
- 2 =I do this INFREQUENTLY (means you rarely do this activity)
- 3= I do this INCONSISTENTLY (means you once or twice do this activity)
- 4= I do this FREQUENTLY (means you sometimes do this activity)
- 5= I do this ALWAYS

Each dimension of metacognition was obtained from the respective subdimensions assigned to each one. For example, to get the Knowledge of Cognitive Processes dimension, the Declarative, Procedural and Conditional subdimensions had to be evaluated (see table 6). The subdimensions assessment resulted from the sum of the responses rated from 1 to 5 on the Likert scale applied.

The sum of the values of the subdimensions allows obtaining the value of the dimension.

The sum of the values of the dimensions provides the importance of metacognition. Metacognition is also obtained from the sum of the responses assigned to each of the 52 items, with which the following values can be obtained:

- If the score assigned to each question is 1, the sum would be 52 points, which is the value of metacognition.
- If the score assigned to each question is 2, the sum would be 104 points, which is the value of metacognition.
- If the score assigned to each question is 3, the sum would be 156 points, which is the value of metacognition.

- If the score assigned to each question is 4, the sum would be 208 points, which is the value of metacognition.
- If the score assigned to each question is 5, the sum would be 260 points, which is the value of metacognition.
-

Therefore, the metacognition values indicate the level of development the participants have in this aspect, where 52 points are the lowest level of development and 260 points the highest growth.

3.2. Dimension: Knowledge of Cognitive Processes

The Knowledge of Cognitive Processes (KOC) dimension has three subdimensions. The sum of the scores obtained in each one of them allows for determining the general assessment of KOC. These subdimensions are:

- i. Declarative
- ii. Procedural
- iii. Conditional

3.3. Declarative Subdimension Results: Pretest vs. Post-test

The evaluation of the Declarative subdimension was carried out through 8 items, using a Likert scale from 1 to 5 points (see appendix 1). Therefore, the minimum score to obtain would be 8 points and the maximum 40 points. The evaluation of the Declarative subdimension in the pretest among the 50 participants reported that 42% reached a score higher than 18 in this criterion. With the application of metacognitive strategies, an improvement was observed since 80% achieved a score higher than 18 points (see table 15).

Table 15*Frequency Table Declarative Subdimension: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
14	0	0,00%	1	2,00%
15	1	2,00%	0	0,00%
16	8	16,00%	2	4,00%
17	5	10,00%	2	4,00%
18	15	30,00%	5	10,00%
19	6	12,00%	3	6,00%
20	6	12,00%	5	10,00%
21	5	10,00%	3	6,00%
22	2	4,00%	1	2,00%
23	1	2,00%	0	0,00%
24	1	2,00%	1	2,00%
25	0	0,00%	2	4,00%
26	0	0,00%	0	0,00%
27	0	0,00%	2	4,00%
28	0	0,00%	4	8,00%
29	0	0,00%	4	8,00%
30	0	0,00%	4	8,00%
31	0	0,00%	7	14,00%
32	0	0,00%	0	0,00%
33	0	0,00%	3	6,00%
34	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Procedural Subdimension Results: Pretest vs. Post-test

The evaluation of the Procedural subdimension was carried out through 4 items, using a Likert scale from 1 to 5 points (see appendix 1). Therefore, the minimum score to obtain would be 4 points and the maximum 20 points. The evaluation of the Procedural subdimension in the pretest among the 50 participants reported that 28% reached a score higher than 6 in this criterion. An improvement was observed with the application of metacognitive strategies since 66% achieved a score higher than 6 points (see table 16).

Table 16

Frequency Table Procedural Subdimension: Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
4	2	4,00%	1	2,00%
5	6	12,00%	1	2,00%
6	28	56,00%	15	30,00%
7	12	24,00%	4	8,00%
8	1	2,00%	1	2,00%
9	0	0,00%	0	0,00%
10	1	2,00%	0	0,00%
11	0	0,00%	1	2,00%
12	0	0,00%	3	6,00%
13	0	0,00%	8	16,00%
14	0	0,00%	8	16,00%
15	0	0,00%	7	14,00%
16	0	0,00%	0	0,00%
17	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Conditional Subdimension Results: Pretest vs. Post-test

The evaluation of the Conditional subdimension was carried out through 5 items, using a Likert scale from 1 to 5 points (see appendix 1). Therefore, the minimum score to obtain would be 5 points and the maximum 25 points. The evaluation of the Conditional subdimension in the pretest among the 50 participants reported that 50% reached a score higher than 11 in this criterion. An improvement was observed with the application of metacognitive strategies since 78% achieved a score higher than 11points (see table 17).

Table 17

Frequency Table Conditional Subdimension: Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
8	0	0,00%	1	2,00%
9	4	8,00%	1	2,00%
10	5	10,00%	4	8,00%
11	16	32,00%	5	10,00%
12	14	28,00%	4	8,00%
13	8	16,00%	6	12,00%
14	2	4,00%	1	2,00%
15	1	2,00%	0	0,00%
16	0	0,00%	2	4,00%
17	0	0,00%	8	16,00%
18	0	0,00%	2	4,00%
19	0	0,00%	8	16,00%
20	0	0,00%	6	12,00%
21	0	0,00%	1	2,00%
22	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Knowledge of Cognitive Processes Results: Pretest vs. Post-test

The Knowledge of Cognitive Processes evaluation is carried out by adding the scores obtained in the Declarative, Conditional, and Procedural subdimensions. The minimum value of the sum is 17 points, and the maximum is 85 points. The Knowledge of Cognitive Processes dimension evaluation in the pretest reported that 40% of the English students had a score higher than 36 points. In comparison, in the posttest, the value increased to 76%. These results are attributed to metacognitive strategies (see table 18).

Table 18*Frequency Table Knowledge of Cognitive Processes: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
30	1	2,00%	0	0,00%
31	1	2,00%	1	2,00%
32	1	2,00%	0	0,00%
33	6	12,00%	0	0,00%
34	4	8,00%	4	8,00%
35	6	12,00%	4	8,00%
36	11	22,00%	3	6,00%
37	7	14,00%	3	6,00%
38	4	8,00%	3	6,00%
39	2	4,00%	2	4,00%
40	5	10,00%	1	2,00%
41	0	0,00%	1	2,00%
42	1	2,00%	0	0,00%
43	0	0,00%	0	0,00%
44	0	0,00%	0	0,00%
45	0	0,00%	0	0,00%
46	0	0,00%	0	0,00%
47	0	0,00%	0	0,00%
48	0	0,00%	0	0,00%
49	1	2,00%	0	0,00%
50	0	0,00%	0	0,00%
51	0	0,00%	1	2,00%
52	0	0,00%	0	0,00%
53	0	0,00%	0	0,00%
54	0	0,00%	0	0,00%
55	0	0,00%	0	0,00%
56	0	0,00%	1	2,00%
57	0	0,00%	3	6,00%
58	0	0,00%	3	6,00%
59	0	0,00%	1	2,00%
60	0	0,00%	2	4,00%
61	0	0,00%	0	0,00%
62	0	0,00%	4	8,00%
63	0	0,00%	2	4,00%
64	0	0,00%	4	8,00%
65	0	0,00%	1	2,00%
66	0	0,00%	2	4,00%
67	0	0,00%	0	0,00%
68	0	0,00%	4	8,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Dimension: Regulation of Cognition

The Regulation of Cognition (ROC) dimension has five subdimensions. The sum of the scores obtained in each one allows for determining the general assessment of ROC. These subdimensions are:

- Planning
- Information Management Strategies
- Comprehension Monitoring
- Debugging Strategies
- Evaluation

Planning Subdimension Results: Pretest vs. Post-test

The evaluation of the Planning subdimension was carried out through 7 items, using a Likert scale from 1 to 5 points (see appendix 1). Therefore, the minimum score would be 7 points and the maximum of 35 points. The evaluation of the Planning subdimension in the pretest among the 50 participants reported that 58% reached a score higher than 11 in this criterion. An improvement was observed with the application of metacognitive strategies since 88% achieved a score higher than 11points (see table 19).

Table 19*Frequency Table Planning subdimension: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
9	1	2,00%	1	2,00%
10	6	12,00%	0	0,00%
11	14	28,00%	5	10,00%
12	13	26,00%	4	8,00%
13	9	18,00%	2	4,00%
14	4	8,00%	3	6,00%
15	2	4,00%	7	14,00%
16	0	0,00%	0	0,00%
17	1	2,00%	0	0,00%
18	0	0,00%	1	2,00%
19	0	0,00%	0	0,00%
20	0	0,00%	2	4,00%
21	0	0,00%	6	12,00%
22	0	0,00%	2	4,00%
23	0	0,00%	1	2,00%
24	0	0,00%	3	6,00%
25	0	0,00%	1	2,00%
26	0	0,00%	6	12,00%
27	0	0,00%	3	6,00%
28	0	0,00%	2	4,00%
29	0	0,00%	0	0,00%
30	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

3.4. Information Management Strategies Subdimension Results: Pretest vs. Post-test

The Information Management Strategies subdimension evaluation was carried out through 10 items, using a Likert scale of 1 to 5 points (see appendix 1). Therefore, the minimum score to obtain would be 10 points and the maximum 50 points. The pretest evaluation of the Information Management Strategies subdimension among the 50 participants reported that 58% reached a score greater than 14 in this criterion. With the application of metacognitive strategies, an improvement was observed since 92% achieved a higher score of 14 points (see table 20).

Table 20

Frequency Table Information Management Strategies subdimension: Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
13	6	12,00%	1	2,00%
14	15	30,00%	3	6,00%
15	10	20,00%	2	4,00%
16	6	12,00%	4	8,00%
17	7	14,00%	2	4,00%
18	3	6,00%	3	6,00%
19	2	4,00%	3	6,00%
20	0	0,00%	0	0,00%
21	0	0,00%	1	2,00%
22	1	2,00%	1	2,00%
23	0	0,00%	1	2,00%
24	0	0,00%	1	2,00%
25	0	0,00%	0	0,00%
26	0	0,00%	0	0,00%
27	0	0,00%	0	0,00%
28	0	0,00%	0	0,00%
29	0	0,00%	0	0,00%
30	0	0,00%	1	2,00%
31	0	0,00%	1	2,00%
32	0	0,00%	0	0,00%
33	0	0,00%	1	2,00%
34	0	0,00%	3	6,00%
35	0	0,00%	4	8,00%
36	0	0,00%	4	8,00%
37	0	0,00%	2	4,00%
38	0	0,00%	4	8,00%
39	0	0,00%	6	12,00%
40	0	0,00%	0	0,00%
41	0	0,00%	1	2,00%
42	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Comprehension Monitoring Subdimension Results: Pretest vs. Post-test

The evaluation of the Comprehension Monitoring subdimension was carried out through 7 items, using a Likert-types Cale from 1 to 5 points (see appendix 1). Therefore, the minimum score would be 7 points and the maximum of 35 points. The evaluation of the Comprehension Monitoring subdimension in the pretest among the 50 participants reported that 10% achieved a score greater than 11 in this criterion. With the application of metacognitive strategies, an improvement was observed since 74% achieved as core greater than 11 points (see table 21).

Table 21

Frequency Table Comprehension Monitoring subdimension: Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
8	8	16,00%	0	0,00%
9	14	28,00%	4	8,00%
10	12	24,00%	5	10,00%
11	11	22,00%	4	8,00%
12	4	8,00%	3	6,00%
13	0	0,00%	3	6,00%
14	0	0,00%	3	6,00%
15	0	0,00%	0	0,00%
16	1	2,00%	0	0,00%
17	0	0,00%	0	0,00%
18	0	0,00%	0	0,00%
19	0	0,00%	1	2,00%
20	0	0,00%	0	0,00%
21	0	0,00%	0	0,00%
22	0	0,00%	0	0,00%
23	0	0,00%	2	4,00%
24	0	0,00%	1	2,00%
25	0	0,00%	7	14,00%
26	0	0,00%	4	8,00%
27	0	0,00%	3	6,00%
28	0	0,00%	2	4,00%
29	0	0,00%	5	10,00%
30	0	0,00%	1	2,00%
31	0	0,00%	2	4,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Debugging Strategies Subdimension Results: Pretest vs. Post-test

The evaluation of the Debugging Strategies subdimension was carried out through 5 items, using a Likert-types Cale from 1 to 5 points (see appendix 1). Therefore, the minimum score to obtain would be 5 points and the maximum 25 points. The pretest evaluation of the Debugging Strategies subdimension among the 50 participants reported that 30% achieved a score greater than 18 in this criterion. With the application of metacognitive strategies, an improvement was observed since 34% achieved as core greater than 18 points (see table 22).

Table 22*Frequency Table Debugging Strategies subdimension: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
7	0	0,00%	1	2,00%
8	1	2,00%	2	4,00%
9	5	10,00%	5	10,00%
10	6	12,00%	4	8,00%
11	7	14,00%	5	10,00%
12	2	4,00%	3	6,00%
13	1	2,00%	1	2,00%
14	0	0,00%	1	2,00%
15	1	2,00%	1	2,00%
16	0	0,00%	0	0,00%
17	0	0,00%	2	4,00%
18	12	24,00%	8	16,00%
19	7	14,00%	4	8,00%
20	8	16,00%	6	12,00%
21	0	0,00%	5	10,00%
22	0	0,00%	2	4,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Evaluation Subdimension Results: Pretest vs. Post-test

The analysis of the Evaluation subdimension was carried out through 6 items, using a Likert-type scale from 1 to 5 points (see appendix 1). Therefore, the minimum score would be 6 points and the maximum 30 points. The pretest's evaluation subdimension among the 50 participants reported that 10% achieved a score greater than 14 in this criterion. With the application of metacognitive strategies, an improvement was observed since 56% achieved a score greater than 14 points (see table 23).

Table 23*Frequency Table Evaluation subdimension: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
9	2	4,00%	4	8,00%
10	6	12,00%	2	4,00%
11	6	12,00%	3	6,00%
12	10	20,00%	7	14,00%
13	12	24,00%	5	10,00%
14	9	18,00%	1	2,00%
15	2	4,00%	0	0,00%
16	1	2,00%	0	0,00%
17	0	0,00%	0	0,00%
18	2	4,00%	1	2,00%
19	0	0,00%	3	6,00%
20	0	0,00%	2	4,00%
21	0	0,00%	3	6,00%
22	0	0,00%	9	18,00%
23	0	0,00%	5	10,00%
24	0	0,00%	2	4,00%
25	0	0,00%	2	4,00%
26	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments**Regulation of Cognition Results: Pretest vs. Post-test**

The Regulation of Cognition is assessed by adding the scores obtained in the Planning, Information Management Strategies, Comprehension Monitoring, Debugging Strategies, and Evaluation subdimensions. The minimum value of the sum is 35 points, and the maximum is 175 points.

The Regulation of Cognition in the pretest among the 50 participants reported that 0% achieved a score greater than 112 in this criterion. With the application of metacognitive strategies, an improvement was observed since 54% achieved a score greater than 112 points (see table 24). The results indicate that the English students who participated in the study significantly improved their ability to control their cognitive processes.

Table 24*Frequency Table Regulation of Cognition: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
53-62	21	42,00%	11	22,00%
63-72	22	44,00%	9	18,00%
73-82	6	12,00%	2	4,00%
83-92	1	2,00%	0	0,00%
93-102	0	0,00%	1	2,00%
103-112	0	0,00%	0	0,00%
113-122	0	0,00%	9	18,00%
123-132	0	0,00%	7	14,00%
133-142	0	0,00%	10	20,00%
143-152	0	0,00%	1	2,00%
Total	50	100,00%	50	100,00%

*Note: This table was taken from the applied instruments***Metacognition Results: Pretest vs. Post-test**

Metacognition is evaluated by adding the scores obtained in the Knowledge of Cognitive Processes and Regulation of Cognition dimensions. The minimum value of the sum is 52 points, and the maximum is 260 points. Metacognition in the pretest among the 50 participants reported that 0% achieved a score greater than 189 in this criterion. An improvement was observed with the application of metacognitive strategies since 32% achieved a score greater than 189 points (see table 25). The results indicate that the English learners who participated in the study have significantly improved their ability to plan, monitor, and evaluate the way they understand and do a task, in other words, to think about their thought processes.

Table 25*Frequency Table Metacognition: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
86-98	22	44,00%	9	18,00%
99-111	24	48,00%	11	22,00%
112-124	3	6,00%	2	4,00%
125-137	0	0,00%	0	0,00%
138-150	1	2,00%	0	0,00%
151-163	0	0,00%	1	2,00%
164-176	0	0,00%	3	6,00%
177-189	0	0,00%	8	16,00%
190-202	0	0,00%	11	22,00%
203-215	0	0,00%	5	10,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

3.5. Results obtained in the evaluation of Critical Thinking

The results presented compare the control and experimental groups on critical thinking. It is important to remember that critical thinking contains 5 subdimensions, which are:

- i. Interpretation (Induction)
- ii. Analysis (Observation)
- iii. Evaluation (assumptions)
- iv. Inference (Deduction)
- v. Explanation (meaning)

An instrument composed of 52 items was applied to assess the subdimensions of critical thinking (see table 7 and appendix 2). The response record for each item used a Likert-type scale where: If the assumption follows the statements given, the student mark A, A's value is equal to 0. If it is contradicting the words given, the student mark B, the value of B is equal to 1. If the conclusion rejects the state-given the student mark C, which value is equal to 2. If the answer to each item is A, the minimum value is 0. When assigning B, the value is 52. When qualifying with C, the maximum value will be 104.

3.6. Interpretation (Induction) Results: Pretest vs. Post-test

The analysis of the Interpretation subdimension was carried out through 8 items, using a scale of 0 to 2 points (see appendix 2). Therefore, the minimum score to obtain would be 0 points and the maximum 16 points. The Interpretation subdimension in the pretest among the 50 participants reported that 0% achieved a score greater than 13 in this criterion. An improvement was observed with the application of metacognitive strategies since 32% achieved a score greater than 13 points (see table 26).

Table 26*Frequency Table Interpretation: Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
1	2	4,00%	1	2,00%
2	7	14,00%	4	8,00%
3	8	16,00%	4	8,00%
4	9	18,00%	1	2,00%
5	14	28,00%	7	14,00%
6	5	10,00%	4	8,00%
7	2	4,00%	0	0,00%
8	1	2,00%	1	2,00%
9	2	4,00%	0	0,00%
10	0	0,00%	0	0,00%
11	0	0,00%	1	2,00%
12	0	0,00%	4	8,00%
13	0	0,00%	7	14,00%
14	0	0,00%	7	14,00%
15	0	0,00%	7	14,00%
16	0	0,00%	2	4,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

3.7. Analysis (Observation) Results: Pretest vs. Post-test

The Analysis (Observation) subdimension analysis was performed through 4 items, using a scale of 0 to 2 points (see appendix 2). Therefore, the minimum score to obtain would be 0 points and the maximum 8 points. The pretest's analysis (Observation) subdimension among the 50 participants reported that 0% achieved score greater than 5 in this criterion. With the application of metacognitive strategies, an improvement was observed since 54% achieved a score greater than 5 points (see table 27).

Table 27*Frequency Table Analysis (Observation): Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
0	10	20,00%	2	4,00%
1	17	34,00%	4	8,00%
2	9	18,00%	7	14,00%
3	8	16,00%	7	14,00%
4	5	10,00%	2	4,00%
5	1	2,00%	1	2,00%
6	0	0,00%	6	12,00%
7	0	0,00%	17	34,00%
8	0	0,00%	4	8,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Evaluation (assumptions) Results: Pretest vs. Post-test

The analysis of the Evaluation(assumptions) subdimension was performed through 10 items, using a scale of 0 to 2 points (see appendix 2). Therefore, the minimum score to obtain would be 0 points and the maximum 20 points. The pretest's evaluation (assumptions) subdimension among the 50 participants reported that 0% achieved score greater than 9 in this criterion. With the application of metacognitive strategies, an improvement was observed since 46% achieved a score greater than 9 points (see table 28).

Table 28*Frequency Table Evaluation (assumptions): Pretest and Post-test*

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
0	2	4,00%	0	0,00%
1	14	28,00%	3	6,00%
2	10	20,00%	4	8,00%
3	18	36,00%	6	12,00%
4	5	10,00%	7	14,00%
5	1	2,00%	1	2,00%
6	0	0,00%	1	2,00%
7	0	0,00%	0	0,00%
8	0	0,00%	1	2,00%
9	0	0,00%	4	8,00%
10	0	0,00%	11	22,00%
11	0	0,00%	9	18,00%
12	0	0,00%	3	6,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Inference (Deduction) Results: Pretest vs. Post-test

The Inference (Deduction) subdimension analysis was performed through 27 items, using a scale of 0 to 2 points (see appendix 2). Therefore, the minimum score to obtain would be 0 points and the maximum of 54 points. The Inference (Deduction) subdimension in the pretest among the 50 participants reported that 0% achieved a score greater than 12 in this criterion. An improvement was observed with the application of metacognitive strategies since 48% achieved a score greater than 12 points (see table 29).

Table 29

Frequency Table Inference (Deduction): Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
1	10	20,00%	1	2,00%
2	14	28,00%	4	8,00%
3	16	32,00%	6	12,00%
4	7	14,00%	9	18,00%
5	2	4,00%	2	4,00%
6	0	0,00%	0	0,00%
7	1	2,00%	0	0,00%
8	0	0,00%	0	0,00%
9	0	0,00%	0	0,00%
10	0	0,00%	1	2,00%
11	0	0,00%	2	4,00%
12	0	0,00%	1	2,00%
13	0	0,00%	6	12,00%
14	0	0,00%	11	22,00%
15	0	0,00%	3	6,00%
16	0	0,00%	4	8,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Explanation (meaning) Results: Pretest vs. Post-test

The Explanation (meaning) subdimension analysis was performed through 11 items, using a scale of 0 to 2 points (see appendix 2). Therefore, the minimum score to obtain would be 0 points and the maximum 22 points. The Explanation (meaning)

subdimension in the pretest among the 50 participants reported that 0% achieved a score greater than 12 in this criterion. An improvement was observed with the application of metacognitive strategies since 44% achieved a score greater than 12 points (see table 30).

Table 30

Frequency Table Explanation (meaning): Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
0	2	4,00%	1	2,00%
1	11	22,00%	4	8,00%
2	16	32,00%	4	8,00%
3	13	26,00%	8	16,00%
4	5	10,00%	3	6,00%
5	3	6,00%	2	4,00%
6	0	0,00%	0	0,00%
7	0	0,00%	0	0,00%
8	0	0,00%	0	0,00%
9	0	0,00%	0	0,00%
10	0	0,00%	1	2,00%
11	0	0,00%	1	2,00%
12	0	0,00%	4	8,00%
13	0	0,00%	4	8,00%
14	0	0,00%	8	16,00%
15	0	0,00%	5	10,00%
16	0	0,00%	5	10,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Critical Thinking Results: Pretest vs. Post-test

Critical thinking is evaluated by adding the scores obtained in the Interpretation (Induction), Analysis (Observation), Evaluation (assumptions), Inference (Deduction), and Explanation (meaning) dimensions. The minimum value of the sum is 0 points, and the maximum is 104 points. Critical thinking in the pretest among the 50 participants reported that 0% achieved a score greater than 53 in this criterion.

An improvement was observed with the application of metacognitive strategies since 52% achieved a score greater than 53 points (see table 31). The results indicate that the English learners who participated in the study have significantly improved their ability to interpret, analyze, evaluate, deduce, and explain.

Table 31

Frequency Table Critical Thinking: Pretest and Post-test

Scores	Pretest		Posttest	
	Frequency	%	Frequency	%
5-11	17	34,00%	3	6,00%
12-18	29	58,00%	17	34,00%
19-25	4	8,00%	1	2,00%
26-32	0	0,00%	1	2,00%
33-39	0	0,00%	0	0,00%
40-46	0	0,00%	0	0,00%
47-53	0	0,00%	2	4,00%
54-60	0	0,00%	17	34,00%
61-67	0	0,00%	9	18,00%
Total	50	100,00%	50	100,00%

Note: This table was taken from the applied instruments

Normality analysis

The Kolmogorov-Smirnov normality test was applied as an initial step to establish the correlation between metacognition and critical thinking. According to the normality test, the indicated procedure allowed us to identify the correlation test, which was Pearson or Spearman.

Pretest results

The Kolmogorov-Smirnov test indicated that metacognition and critical thinking are usually normal distributed in the pretest since the calculated p-value is greater than the theoretical 0.05. Therefore, the correlation test used was Pearson; for more details, see table 32.

Table 32*Pretest: Kolmogorov-Smirnov test for Metacognition and Critical Thinking*

		Metacognition	Critical Thinking
N		50,00	50,00
Normal parameters	Average	101,06	13,22
	Standard deviation	8,88	3,64
Maximum extreme differences	Absolute	0,09	0,10
	Positive	0,09	0,10
	Negative	-0,09	-0,07
Test statistic		0,09	0,10
Asymptotic sig.(bilateral)		,200c,d	,200c,d

Note: This table was taken from the applied instruments

- a. The test distribution is normal.
- b. It is calculated from data.
- c. Lilliefors significance correction.
- d. This is a lower bound of true significance.

Posttest results

The Kolmogorov-Smirnov test indicated that metacognition and critical thinking are not generally distributed in the post-test since the calculated p-value is less than the theoretical 0.01, so the correlation test used was the Rho of Spearman. For more details, please look at table 33.

Table 33*Posttest: Kolmogorov-Smirnov test for Metacognition and Critical Thinking*

		Metacognition	Critical Thinking
N		50,00	50,00
Normal parameters	Average	150,24	39,54
	Standard deviation	46,58	22,01
Maximum extreme differences	Absolute	0,22	0,28
	Positive	0,22	0,24
	Negative	-0,22	-0,28
Test statistic		0,22	0,28
Asymptotic sig.(bilateral)		,000c	,000c

Note: This table was taken from the applied instruments

- a. The test distribution is normal.
- b. It is calculated from data.
- c. Lilliefors significance correction.

Application of T student for independent samples

Pretest

When comparing independent means between the control group and the experimental group in the pretest, it was observed that the control group presented slightly higher results in metacognition and critical thinking when considering the means obtained in each group (see table 34)

Table 34

Pretest: Means and standard deviation of Metacognition and Critical Thinking

Group statistics					
	Type	N	Means	Deviation	Dev. average error
Meta	Control	28	105,6071	8,77429	1,65818
	Experimental	22	95,2727	4,74273	1,01115
CT	Control	28	14,2143	3,96613	,74953
	Experimental	22	11,9545	2,76848	,59024

Note: This table was taken from the applied instruments

The results in Table 35 indicate differences between the control and experimental groups since, at a significance level of 0.05, metacognition and critical thinking obtained values lower than the p-value. These results indicate that in the pretest, the control group presented greater metacognition and critical thinking development than the experimental group.

Table 35

Pretest: Independent Samples T-Test for Metacognition and Critical Thinking

		Independent samples test								
		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	gl	Sig. (bilateral)	t-test for equality of means	Standard error difference	95% confidence interval of the difference	
Meta	Equal variances are assumed	2,282	,137	4,976	48	,000	10,33442	2,07698	6,15836	14,51047
	Equal variances are not assumed			5,321	43,143		10,33442	1,94217	6,41804	14,25079
CT	Equal variances are assumed	2,427	,126	2,271	48	,028	2,25974	,99518	,25880	4,26068
	Equal variances are not assumed			2,369	47,423		2,25974	,95403	,34093	4,17855

Note: This table was taken from the applied instruments

Posttest

When comparing independent means between the control group and the experimental group in the posttest, it was observed that the experimental group presented superior metacognition and critical thinking results when considering the means obtained in each group (see Table 36).

Table 36

Posttest: Means and standard deviation of Metacognition and Critical Thinking

Group statistics					
	Type	N	Means	Deviation	Dev. average error
Meta	Control	28	116,5714	34,35267	6,49204
	Experimental	22	193,0909	10,48313	2,23501
CT	Control	28	25,0714	19,45351	3,67637
	Experimental	22	57,9545	3,03122	0,64626

Note: This table was taken from the applied instruments

Posttest: Normality analysis with the U-Mann Whitney test

Comparative analysis of critical thinking in the control and experimental group after the intervention

To assess whether the application of metacognitive strategies affected the development of critical thinking, a comparison was made between the control and experimental groups to check whether they were different. The average range of the experimental group was higher, with a value of 34.84 points. In comparison, the control group obtained 18.16 points, with which it is concluded that the application of metacognitive strategies improved the development of critical thinking among the members of the experimental group, which did not occur among the members of the control group since they did not apply the metacognitive strategies (see table 37).

Table 37

U-Mann Whitney test of the critical thinking variable applied to the control and experimental group

		Ranks		
	Type	N	Average range	Sum of ranks
Critical Thinking	Control	28	18,16	508,50
	Experimental	22	34,84	766,50
	Total	50		

Note: This table was taken from the applied instruments

Test statistics	
	Critical Thinking
U-Mann-Whitney	102,500
W-Wilcoxon	508,500
Z	-4,025
Asymptotic sig.(bilateral)	,000
a. Grouping variable: Type	

Note: This table was taken from the applied instruments

As can be seen, the Mann-Whitney U statistician was 102.50. The p-value (Sig. asymptotic. (bilateral)) was 0.000, so the null hypothesis is rejected that the level of critical thinking of the control group and experimental were the same after applying the metacognitive strategies. It is concluded that there are differences between the control and experimental groups, with a significance level of 1% (see table 37).

Correlation between Metacognition and Critical Thinking

Pretest results

The degree of association between Metacognition and Critical Thinking was obtained with the Pearson test. The p-value was 0.007 (see table 39), less than 0.01, 0.05, and 0.1. Therefore, there is a statistically significant association between Metacognition and Critical Thinking in the pretest.

There is considerable consensus when interpreting the values of the Pearson correlation coefficient using the following criteria (and considering the absolute values):

0.00 – 0.19 very low correlation

0.20 – 0.39 low correlation

0.4 – 0.59 moderate correlation

0.6 – 0.79 good correlation

0.8 – 1 very good correlation

Considering that the relationship between metacognition and critical thinking reports a Pearson correlation coefficient of 0.378 (see table 38), it is concluded that there is a low correlation.

Table 38

Pretest: Pearson Correlation between Metacognition and Critical Thinking

		Metacognition	Critical Thinking
Metacognition	Pearson correlation	1	,378**
	Sig. (bilateral)		0,007
	N	50	50
Critical Thinking	Pearson correlation	,378**	1
	Sig. (bilateral)	0,007	
	N	50	50

** . The correlation is significant at the 0.01 level (bilateral).

Note: This table was taken from the applied instruments

Posttest results

The degree of association between Metacognition and Critical Thinking was obtained with Spearman's Rho test. The significance value is 0.000, which is less than 0.01. Therefore, we have a statistically substantial connotation between metacognition and critical thinking in the posttest. The correlation coefficient was 0.753 (see table 39), indicating that they are strongly related.

Table 39*Posttest: Correlation between Metacognition and Critical Thinking*

		Critical Thinking	Metacognition
Spearman's rho	Critical Thinking	Coeficiente de correlación	1,000
		Sig. (bilateral)	,753**
		N	50
	Metacognition	Coeficiente de correlación	,753**
		Sig. (bilateral)	1,000
		N	50

** . La correlación es significativa en el nivel 0,01 (bilateral).

Note: This table was taken from the applied instruments

There is considerable consensus when interpreting the values of the Spearman correlation coefficient using the following criteria (and considering the absolute values):

0.00 – 0.19 very low correlation

0.20 – 0.39 low correlation

0.4 – 0.59 moderate correlation

0.6 – 0.79 good correlation

0.8 – 1 very good correlation

The Spearman correlation coefficient that was obtained between metacognition and critical thinking was 0.753 (see table 40), with which it is concluded that there is a strong positive correlation between the variables analyzed. Before applying the strategy, the correlation between the variable metacognition and critical thinking was low. With the implementation of the strategy by the experimental group, an increase in the correlation coefficient was recorded, which indicates that the strategy contributed to the development of critical thinking through metacognition. It is proposed for future research to determine the influence of the strategy used in improving critical thinking through regression analysis.

According to Sadeghi, Taghi Hassani, and Rahmatkhah (2014), they state that: "the more metacognitive strategies increase in students, the more critical thinking also improves" (p. 1167).

Arslan (2015) shows a positive relationship between metacognition and critical thinking.

Çakıcı (2018) suggests that: "higher education instructors should mostly be trained about how to teach learning strategies that facilitate CTS and to nurture the students' talents to be metacognitively aware" (p.124).

This research found that there is a positive relationship between metacognition and critical thinking, which coincides with the investigation by Naimnule and Duran Corebima (2018).

Verification of the hypothesis: Wilcoxon test

Comparative analysis of critical thinking in the experimental group before and after the intervention

To evaluate whether the application of metacognitive strategies had an impact on the improvement of critical thinking of the students that made up the experimental group, the non-parametric Wilcoxon test was applied. The results are shown in the following table:

Table 40

Critical thinking ranges in the experimental group

		Ranks		
		N	Average range	Sum of ranks
Post - Pre	Negative ranges	0 ^a	0,00	0,00
	Positive ranges	22 ^b	11,50	253,00
	Ties	0 ^c		
	Total	22		

Note: This table was taken from the applied instruments

Table 40 shows the comparison of the results obtained by the experimental group before and after the application of metacognitive strategies, concluding that the strategy only caused positive effects among the students who received the treatment. There were no negative values or ties.

Table 41*Wilcoxon test of the critical thinking variable applied to the experimental group*

Test statistics	
	Post – Pre
Z	-4,112 ^b
Asymptotic sig.(bilateral)	,000
a. Wilcoxon signed rank test	
b. It is based on negative ranges.	

Note: This table was taken from the applied instruments

It can be said that since the value of p (Sig. asymptotic. (bilateral)) was less than 0.01, then the null hypothesis is rejected that the level of critical thinking of the experimental group before and after the application of the strategies of metacognitive strategies remained the same. Therefore, it is concluded that there is sufficient evidence to suggest that metacognitive strategies were effective in improving critical thinking with a significance level of 1% (see table 40 -41).

CONCLUSIONS

- The analysis of the theoretical part allowed us to discover strategies that can be used to develop language skills inside and outside the classroom, some of them applied to certain specific skills and others with modifications such as the KW Charts, which allowed a greater focus on helping students with their self-regulation of learning and better use of their skills when performing any activity, especially during virtual classes and others to perform specific topics, but not combined, so modifications were made, as is the case of the KW Charts, which allowed a greater focus on helping students with their self-regulation of learning and on better use of their skills when performing any activity. As a result, it provided better performance and better analysis of the revised contents and their discussion, and autonomous work as part of the process.
- The groups were exposed to the tests of both variables, where at the beginning, the experimental and control groups showed similarities in terms of the lack of knowledge of their abilities to solve academic activities and the use of self-regulation as part of the individual learning strategies and control of their own learning, as well as the ability to monitor and evaluate the progress of their activities. After the intervention in the experimental group with the application of metacognitive strategies, an improvement was observed, reaching a high application of the same followed in the instruments in the posttest, which reflected a better control of self-reflection, observation, analysis, use of strategies to solve problems given in cases of the topics of the text of daily use. Therefore, it can be concluded that the intervened group obtained high results and better use of the language when discussing, giving opinions, solving exercises, and applying the language to talk about simple and complex topics.
- It takes a lot of discipline, time, and training for students to learn to relate to the strategies and to understand that learning to learn is a central fragment of the teaching and learning process and is not just a matter of mechanically receiving a class without setting one's own objectives and goals and that it is the student who

complements and controls his own learning and can use his own strategies to achieve more effective learning.

- It is concluded that by applying the metacognitive strategies, an improvement in the main dimensions related to Knowledge of Cognition, where Procedural Knowledge and Declarative Knowledge, where it is observed that the student is more aware of the management of the topics, content as well as the type of strategies used for the tasks to be performed, which is related to the ability of analysis and observation in terms of critical thinking, could be evidenced.
- The dimension related to the regulation of cognition shows better management of the aspects of monitoring and control of learning where the students under guidance improved the ability to regulate themselves their learning process and likewise the teacher's skill to teach them to learn, even achieving greater control in autonomous learning, considering that due to the conditions created by the pandemic, However, the work strategies were good tools to enrich and strengthen the skills and competencies proposed at the beginning of the planning and that could be regulated and monitored with the instruments and strategies applied, being reflection and self-reflection the most developed skill.
- By developing self-reflection, students showed a predisposition to self-correct and avoid responding in a routinized way which implies being mindful and giving way to Flexibility of thought related to the sub-skill of explanation which allowed them to be able to declare results in a structured form in specific tasks, especially in the sections that involve showing this ability, especially in terms of Justify Procedures, as it became easier to present evidence and other considerations for review to justify methodologies of how to solve a given task or questions towards this point.
- Metacognitive strategies such as CATS allowed to develop a way to determine and judge the weak and strong arguments referring to the sub-skill of evaluation in CT for which they need to forge their technical skills and apply them to the specific topic with sequence, precision, and confluence.

RECOMMENDATIONS

- It is advisable to initiate and use these strategies from an early age so that students become familiar with the process of self-reflection, self-correction, since in some cases when sure students begin the process of admitting that they have made mistakes or that they need to review what was not achieved, it is seen that somehow it is not part of learning. Therefore, teaching students to reflect on how to monitor their knowledge helps them correct errors that are often not tangible for the teacher, even more so when working virtually.
- The use of KWL Charts can be used not only to develop reading skills it can be applied to other skills and topics, allowing better control on the aspect that the student will do to complement what the teacher plans and spreads in the classroom, which in this sense enables the student to have better control over the information and topics to be reviewed, helping to develop a better understanding and criticality in analyzing all types of information, especially if students have to work virtually.
- The ability to learn concerning the sub-skill of Inference (Deduction) had a positive result. This aspect is one of the most complex that could be evidenced, as it helped students recognize how they can evaluate a situation make a decision based on critical thinking skills. This strengthened their decision-making and confidence in their choices, which means that they are better able to find various points of view to a problem and can quickly judge what to do. This means that if students have to solve a problem, they can do so more rapidly without wasting time wondering if they are solving something correctly or not. They know because of their training in critical thinking and decision making in a thoughtful way

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	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
5. I understand my intellectual strengths and weaknesses.					
10. I know what kind of information is most important to learn.					
12. I am good at organizing information.					
16. I know what the teacher expects me to learn.					
17. I am good at remembering information.					
20. I have control over how well I learn.					
32. I am a good judge of how well I understand something.					
46. I learn more when I am interested in the topic.					
TOTAL					

PROCEDURAL KNOWLEDGE

	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
3. I try to use strategies that have worked in the past.					
14. I have a specific purpose for each strategy I use.					
27. I am aware of what strategies I use when I study					
33. I find myself using helpful learning strategies automatically.					
TOTAL					

CONDITIONAL KNOWLEDGE

	I NEVER do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS

15. I learn best when I know something about the topic.					
18. I use different learning strategies depending on the situation.					
26. I can motivate myself to learn when I need to.					
29. I use my intellectual strengths to compensate for my weaknesses.					
35. I know when each strategy I use will be most effective.					
TOTAL					

REGULATION OF COGNITION

PLANNING

	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
4. I pace myself while learning in order to have enough time.					
6. I think about what I really need to learn before I begin a					

task.					
8. I set specific goals before I begin a task.					
22. I ask myself questions about the material before I begin.					
23. I think of several ways to solve a problem and choose the best one.					
42. I read instructions carefully before I begin a task					
45. I organize my time to best accomplish my goals.					
TOTAL					

	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
9. I slow down when I encounter important information.					
13. I consciously focus my attention on important information.					
30. I focus on the meaning and significance of new information.					
31. I create my own examples to make information more meaningful.					
37. I draw pictures or diagrams to help me understand while learning.					
39. I try to translate new information into my own words.					
41. I use the organizational structure of the text to help me learn.					
43. I ask myself if what I'm reading is related to what I already know.					
47. I try to break studying down into smaller steps.					
48. I focus on overall meaning rather than specifics.					
TOTAL					

COMPREHENSION MONITORING

	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
1. I ask myself periodically if I am meeting my goals.					
2. I consider several alternatives to a problem before I answer.					
11. I ask myself if I have considered all options when solving a problem.					
21. I periodically review to help me understand important relationships.					
28. I find myself analyzing the usefulness of strategies while I study.					
34. I find myself pausing regularly to check my comprehension.					
49. I ask myself questions about how well I am doing while learning something new.					
TOTAL					

DEBUGGING STRATEGIES

	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
25. I ask others for help when I don't understand something.					
40. I change strategies when I fail to understand.					
44. I re-evaluate my assumptions when I get confused.					
51. I stop and go back over new information that is not clear.					
52. I stop and reread when I get confused.					

TOTAL					
-------	--	--	--	--	--

EVALUATION	I NEVER do this	I do this INFREQUENTLY	I do this INCONSISTENTLY	I do this FREQUENTLY	I do this ALWAYS
7. I know how well I did once I finish a test.					
19. I ask myself if there was an easier way to do things after I finish a task.					
24. I summarize what I've learned after I finish.					
36. I ask myself how well I accomplish my goals once I'm finished.					
38. I ask myself if I have considered all options after I solve a problem.					
49. I ask myself if I learned as much as I could have once I finish a task.					
TOTAL					

Evaluation Tool
CRITICAL THINKING 1

General Information

Date: _____

Level: _____

Student: (Id number)

--	--	--	--	--	--	--	--	--	--

Gender: Male

☐

Female

☐

Age:

17 –19

☐

20- 22

☐

23 - 24

☐

Objective

- To determine how metacognitive strategies, develop critical thinking.

The second part of the test has some questions that need to be understood so you can choose what you think is the **MORE LOGIC** response according to the situation.

Instructions:

- Please read carefully the items, answer according to your opinion.

Mark with and X where you think is the answer according to your case

SECTION IA

In the first five items, two men are debating about voting by eighteen-year-olds. Mr. P. is the speaker in the first three items, Mr. W. in the last two. Each item presents a set of statements and a conclusion. In each item, the conclusion is underlined. Do not be concerned with whether or not the conclusions or statements are true

Mark items 1 through 5 according to the following system:

If the conclusion **follows necessarily** from the statements given, mark **A**.

If the conclusion **contradicts** the statements given, mark **B**.

If the conclusion **neither** follows necessarily nor contradicts the state-given, mark **C**.

If a conclusion follows necessarily, a person who accepts the statements is unavoidably committed to accepting the conclusion. When two things are contradictory, they cannot both be correct.

CONSIDER EACH ITEM INDEPENDENTLY OF THE OTHERS.

1. "Mr. W. says that eighteen-year-olds haven't faced the problems of the world, and that anyone who hasn't faced these problems should not be able to vote. What he says is correct, but eighteen-year-olds still should be able to vote. They're mature human beings, aren't they? "

If the conclusion **follows necessarily** from the statements given, mark **A**.

If the conclusion **contradicts** the statements given, mark **B**.

If the conclusion **neither** follows necessarily nor contradicts the state-given, mark **C**.

2. "Furthermore, eighteen-year-olds should be allowed to vote because anyone who will suffer or gain from a decision made by the voters ought to be permitted to vote. It is clear that eighteen-year-olds will suffer or gain from the decisions of the voters."

Answer:

A		B		C	
---	--	---	--	---	--

3. "Many eighteen-year-olds are serving their country. Now there can be no doubt that many people serving their country ought to be allowed the vote. From this you can see that many eighteen-year-olds ought to be allowed to vote."

Answer:

A		B		C	
---	--	---	--	---	--

4. "I agree with Mr. P. that anyone who will suffer or gain from a decision made by the voters ought to be permitted to vote. And it is true that eighteen-year-olds will suffer or gain from these decisions. But so, will ten-year-olds. Therefore, eighteen-year-olds shouldn't be allowed to vote."

Answer:

A		B		C	
---	--	---	--	---	--

5. "Most eighteen-year-olds don't know the difference between right and wrong. The right to vote should not be possessed by the members of a group if most of them don't know this difference. It is obvious then that eighteen-year-olds shouldn't have the right to vote."

Answer:

A		B		C	
---	--	---	--	---	--

SECTION IB

In the next five items, the two men are debating about immigration. Mr. P. is speaking in the first three items, Mr. W. in the last two.

Use the same system to mark items 6 through 10:

A. Conclusion **follows necessarily** from the statements given.

B. Conclusion **contradicts** the statements given.

C. **Neither.**

CONSIDER EACH ITEM INDEPENDENTLY OF THE OTHERS.

6. "Mr. W. has proposed that we open our doors to all the foreigners who want to enter our beloved country. But foreigners always have made trouble and they always will. Most of them can't even speak English. Since anybody who makes trouble is bad, it follows that foreigners are bad.

Answer:

A		B		C	
---	--	---	--	---	--

7. "You may not know it, but for the past ten years the Communists in our country have been supporting a policy of unrestricted immigration. It is obvious why they support this policy of opening our doors to foreigners. Now I hate to say this, but Mr. Wilstings' support of this policy leaves us but one conclusion: Mr. Wilstings is a Communist. "

Answer:

A		B		C	
---	--	---	--	---	--

8." Mr. Wilstings has said that most foreigners have made positive contributions to our country, This is true. I will also admit that a group is not bad if most of its members do make positive contributions. But don't be deceived by Mr. Wilstings' fine-sounding language. Foreigners are a bad group and shouldn't be admitted. "

Answer:

A		B		C	
---	--	---	--	---	--

9." I'm sorry that Mr. Pinder feels that way about it. Sure, foreigners make trouble and most of them can't speak English. But even though it's true that people who make trouble ought not to be admitted, we still ought to admit foreigners to our country. You don't want to be selfish, do you? "

Answer:

A		B		C	
---	--	---	--	---	--

10." All of you think it was all right to open our doors to all people from distant lands in the nineteenth century. Any person who thinks it was all right to do so at that time ought also to be in

favor of doing so now. Thus, you ought to be in favor of opening our doors now to those from distant lands who are seeking admission to our country

Answer:

A		B		C	
---	--	---	--	---	--

SECTION II

The discussion that follows is divided into parts to correspond to items // through 21. There is faulty thinking going on in each part. Your job for each item is to **pick the one best reason why the thinking is defective/wrong**.

To take this part of the test, you need not know anything about the chlorination of water supplies.

11.

DOBERT: I hear that you and some other crackpots are trying to get Gallton to chlorinate its water supply. You seem to think that this will do some good, there can be no doubt that either we should chlorinate or we shouldn't. Only a fool would be in favor of chlorinating the water, so we ought not do it.

ALGAN: You are correct at least in saying that we are trying to get the water chlorinated.

Pick the one best reason why some of this thinking is faulty.

A. Dobert is mistakenly assuming that there are only two alter- natives.

B. Dobert is using a word in two ways.

C. Dobert is using emotional language that doesn't help to make his argument reasonable.

Answer:

A		B		C	
---	--	---	--	---	--

12.

DOBERT: I guess you know that to put chlorine in the water is to threaten the health of every one of Gallton's citizens, and that, you ' ll admit, is bad.

ALGAN: What right do you have to say that our health will be threatened?

DOBERT: "Healthy living" may be defined as living according to nature. Now, we don't find chlorine added to water in nature. Therefore, everyone's health would be threatened if chlorine were added. Pick the one best reason why some of this thinking is faulty.

A. Dobert is using emotional language that doesn't help to make his argument reasonable.

B. Dobert's thinking is in error.

C. Dobert is using a word in two different ways.

Answer:

A		B		C	
---	--	---	--	---	--

13.

DOBERT: Furthermore, Gallton's water is pure already. I know this from the report, which you haven't seen yet, that will soon be released by the State Water Survey.

ALGAN: You can't know that Gallton's water is pure. The State Water Survey didn't test all the water that we have available to us. They only took samples. Furthermore, you can't know that they didn't make an error in their investigation because there's always a chance for error in any investigation. Therefore, you could never know that Gallton's water is pure.

Pick the one best reason why some of this thinking is faulty.

- A. Algan is not using "know" in its ordinary sense, yet he is expecting the effect that follows from its being used in the ordinary sense.
- B. Dobert, in using secret evidence, is not being fair, since this evidence is not available to everyone for inspection.
- C. Algan can't know that an error was made in the investigation.

Answer:

A		B		C	
---	--	---	--	---	--

14.

DOBERT: I understand that you look on this thing as an experiment. I'm sure that the citizens of Gallton don't want to be guinea pigs in this matter.

ALGAN: This is a demonstration. Nobody ought to object to a demonstration, since the purpose of a demonstration is not to find out something, but rather to show us something that is already known. An additional value of this demonstration of chlorination is that its purpose is also to test for the long-range effects of chlorination on the human body. This objective of the demonstration is a worthy one.

Pick the one best reason why some of this thinking is faulty.

- A. Algan has not shown that knowing the long-range effects of chlorination is a worthy objective.
- B. Algan is using a word in two ways.
- C. There is an error in thinking in this part.

Answer:

A		B		C	
---	--	---	--	---	--

15.

ALGAN: The question boils down to two alternatives. Either we want clean, chlorinated water or we want bad-smelling, disease-ridden water. The citizens of Gallton certainly don't want bad-smelling, disease-ridden water. What is left but to chlorinate?

Pick the one best reason why some of this thinking is faulty.

- A. Algan hasn't shown that there are only two alternatives.
- B. Algan is using emotional language that doesn't help to make the argument reasonable.

C. Algan is using the same word in two ways.

Answer:

16.

A		B		C	
---	--	---	--	---	--

DOBERT: Laying aside the question of whether medication is bad or good, wouldn't you say that you are proposing a plan for medication?

ALGAN: Not at all, is killing germs in the water supply the same as treating a disease of the human body? Certainly not. There- fore, my plan cannot be called a plan for medication.

DOBERT: Oh, but it is medication. Isn't one of your stated goals the prevention of disease? Medication is the process of trying to restore or preserve health in any manner whatsoever. Whether your plan actually would result in preserving or restoring health doesn't matter. The point is that you would be trying to do so and thus would be medicating people.

Pick the one best reason why some of this thinking is faulty.

A. There is a serious mistake in the thinking in this part.

B. Dobert's conclusion doesn't necessarily follow from the rea-sons he gives.

C. Dobert and Algan are using the same word differently.

Answer:

17.

A		B		C	
---	--	---	--	---	--

DOBERT: Can you prove that chlorination is useful in making water safe?

ALGAN: Yes, I can. Devton gets its water from the same place that we do. Three years ago, Devton had nine cases of typhoid fever. Two years ago, they started to chlorinate and they had only two cases that year. That's proof enough.

Pick the one best reason why some of this thinking is faulty.

A. Algan is using the same word in two ways.

B. That's not a big enough reduction. If there were no typhoid at all the second year, then Algan would have proven his statement.

C. One such comparison is not enough to prove such a statement.

Answer:

A		B		C	
---	--	---	--	---	--

18.

DOBERT: In reality, you are proposing to poison our water supply when you propose to put chlorine gas in the water. Chlorine gas has been used in war to kill human beings. It is a deadly poison. Nobody wants to be poisoned.

ALGAN: But when chlorine is mixed 3 1/2 parts per million, nobody will be hurt at all.

DOBERT: That's not the point. You'd still be putting a deadly poison in the water. That's what it means to poison the water. So, anyone drinking the water would necessarily be poisoned.

Pick the one best reason why some of this thinking is faulty.

- A. Algan is missing the point.
- B. Dobert is using the same word in two ways.
- C. Dobert's thinking is in error.

Answer:

19.

A		B		C	
---	--	---	--	---	--

DOBERT: Furthermore, Gallton's water is safe now.

ALGAN: That's not true. Nothing is safe as long as there's a conceivable chance for something to go wrong. From this it follows that Gallton's water is not safe.

Pick the one best reason why some of this thinking is faulty.

- A. Algan has made the word "safe" useless for communicating information.
- B. Algan hasn't said what he means by "safe."
- C. There is a flaw in Algan's thinking.

Answer:

20.

A		B		C	
---	--	---	--	---	--

DOBERT: The citizens of Gallton will have to make a choice. Either we want absolutely pure water or we should keep our present setup. Now any chemist can tell you that from a practical point of view it is impossible to remove all the impurities from a water supply. So, we should leave things the way they are.

Pick the one best reason why some of this thinking is faulty.

- A. Dobert hasn't shown that there are only two alternatives.
- B. Dobert is using the same word in two ways.
- C. The conclusion doesn't necessarily follow from the reasons given.

Answer:

21.

A		B		C	
---	--	---	--	---	--

DOBERT: To add chlorine is to add a drug to Gallton's water supply. Obviously, we don't want our citizens to be drugged every time they take a drink of water.

ALGAN: What right do you have to say that chlorine is a drug?

DOBERT: The term "drug" is defined in section 201 (g) of the Federal Food, Drug, and Cosmetic Act as an article intended for use in the diagnosis, cure, treatment, or prevention of disease in man or other animals. Now, since chlorine is intended for use in the prevention of disease, it is a drug.

Pick the one best reason why some of this thinking is faulty.

A. Dobert's thinking is in error.

B. Algan should realize that a person has a right to use a word in a special way. The important thing is that there be under-standing of what is said.

C. Dobert is using a word in two different ways.

Answer:

A		B		C	
---	--	---	--	---	--

SECTIONS III, V, AND V REFER TO THE FOLLOWING EXPERIMENT:

An experiment was performed by Drs. E. E. Brown and M. R. Kolter in the veterinary laboratory of the British Ministry of Agriculture and Fisheries. The doctors were interested in what happens to ducklings that eat cabbage worms. Several cases had been reported to them in which ducklings had "mysteriously" died after being in cabbage patches containing cabbage worms.

Three types of ducklings were secured (Mallards, Pintails, and Canvasbacks), two broods of each. Each brood was then split into two equal groups as much alike as possible. For a one-week period they were provided an approved diet for ducklings. All had this diet, except that half of each brood were provided something more: two cabbage worms daily per duckling.

The condition of the ducklings at the end of the week was observed and is reported in the following table:

TYPE OF DUCKLING	ORIGINAL NUMBER IN BROOD	REGULAR DIET			REGULAR DIET PLUS WORMS		
		Healthy	III	Dead	Healthy	III	Dead
MALLARD	8	3	1			2	2
	6	3					3
PINTAIL	6	2		1			3
	8	3	1		1		3
CANVASBACK	8	4				1	3
	8	3	1			1	3
TOTALS	44	18	3	1	1	4	17

The doctors drew this conclusion: CABBAGE WORMS ARE POISONOUS TO DUCKLINGS.

SECTION III

The experiment attracted a great deal of attention. Many statements were made about the experiment and about the protection of ducklings.

Items 22 through 25 each contain a pair of statements (A & B), which are underlined.

Read both, then decide which, if either, is more believable.

Mark items 22 through 25 according to the following system:

If you think the first is more believable, mark **A**.

If you think the second is more believable, mark **B**.

If neither statement is more believable than the other, mark **C**.

In making your decisions, use the information already provided and the information in parentheses after each statement.

22.

- A. Cabbage worms are poisonous to ducklings (said by Dr. Kolter).
 B. Six Canvasbacks died during the week of the experiment (said by Dr. Kolter).
 C. Neither statement is more believable.

Answer:

23.

A		B		C	
---	--	---	--	---	--

- A. Six Pintails were healthy at the end of the experiment (said by Dr. Brown).
 B. Eour worm-fed ducklings were ill at the end of the experiment (said by Dr. Brown).
 C. Neither statement is more believable.

Answer:

24.

A		B		C	
---	--	---	--	---	--

- A. During the week following the experiment, all of the ill ducklings died. (From an article in a magazine that can be found on almost every newsstand. The author, a popular international writer, stated that I have obtained his information from Drs. Brown and Kolter.)

- B. During the week following the experiment, the rest of the worm-fed ducklings died (from the report written by Drs. Brown and Kolter).
 C. Neither statement is more believable.

25.

- A. Independent laboratory studies have shown conclusively that ducklings sprayed with Wrodane will not be harmed by eating cabbage worms (from an article in a magazine published by a chemical company that makes Wrodane).
 B. No satisfactory way has yet been found to counteract the poisonous effects of cabbage worms on ducklings (from the magazine article mentioned in Item No. 24, which appeared two months after the Wrodane article).
 C. Neither statement is more believable.

Answer:

A		B		C	
---	--	---	--	---	--

SECTION IV

From the original experiment, the doctors drew this conclusion: **CABBAGE WORMS ARE POISONOUS TO DUCKLINGS.**

Mark items 26 through 38 according to the following system:

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

CONSIDER EACH ITEM INDEPENDENTLY OF THE OTHERS.

26. The experiment is repeated. The results are similar.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

27. The experiment is repeated with three different varieties of ducklings, which are younger than the ones used in the original experiment. At the end of the week, two of the regular-diet ducklings are dead, and twenty of the worm- diet ducklings are dead.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

28. At the time of the original experiment, there was an apple tree shedding apple into the cages of both sets of ducklings. The experimenters did not expect this to happen. About the same number of apples fell into each cage. This kind of apple does not affect the health of ducklings.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

29. The experiment is repeated in Canada with twice as many ducklings. None of the ducklings die. At the end of the week, two of the regular-diet ducklings are ill, and three of the worm-diet ducklings are ill.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

30. The experiment is repeated in Scotland. At the end of the week, all of the worm-fed ducklings are dead, and all of the regular-fed ducklings are alive and healthy. But it is discovered that the man who handled the worms had been spraying fruit trees with arsenic and had carelessly transferred some arsenic to the feeding pan of the worm-fed ducklings. Arsenic is a deadly poison.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

31. A team of expert biologists examines the body structure and processes of ten common varieties of ducklings, including the three used in the experiment. The biologists can find no significant differences among the varieties examined except for coloring.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

32. It is discovered that during the original experiment the regular-fed ducklings had less sunlight than the worm-fed ducklings. It is not known whether or not the difference in amount of sun-shine would have an effect on the health of ducklings.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

33. A group of well-known Canadian duck breeders report that they discovered long ago that it was dangerous to ducklings to let them run in a cabbage patch.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

CONSIDER EACH ITEM INDEPENDENTLY OF THE OTHERS.

34. It is discovered that both sets of ducklings reached through their cages and drank water from a little ditch that ran past both cages. They drank practically no water out of the pans that were in the cages. The water in the ditch was ordinary water.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

35. The experiment is repeated in Canada with three different varieties of ducklings. All of the ducklings die, whether worm-fed or not.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

36. The experiment is repeated in the United States with twice as many ducklings. At the end of the week, 40 of the 44 regular-diet ducklings are alive and healthy, and 39 of the 44 worm-fed ducklings are alive and healthy.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

37. It turns out that at the time of the original experiment, a large oak tree was dropping acorns into the cages of the worm-fed ducklings only. The effect of this kind of acorn on the health of ducklings is not known.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

38. A similar experiment is performed with young dogs. Another is performed with young turtles. In both cases the results are similar to those of the original duckling experiment.

- A. If true, this information supports the conclusion.
- B. If true, this information goes against the conclusion.
- C. This information does neither.

Answer:

A		B		C	
---	--	---	--	---	--

SECTION V

A research worker sets out to test the truth of the statement:

IF ANY DUCKLING EATS A CABBAGE WORM, THE DUCKLING WILL DIE
WITHIN SIX HOURS.

The research worker has developed an accurate, painless, and non-injurious stomach-testing method for telling whether a duckling has eaten a cabbage worm during the previous twelve hours. The method can be used both with dead ducks and live ducks.

In planning his experiments, he needs to make some predictions from the above statement.

- a. PREDICTIONS TELL WHAT WOULD BE TRUE, IF THE STATEMENT WERE TRUE.
- b. PREDICTIONS SHOULD BE USEFUL IN GUIDING AN ACTUAL EXPERIMENT.

Remembering these two rules about predictions, answer items 39 through 42. The items refer to the seven possible predictions listed after item 42.

39. Of **j**, **k**, and **l**, which is the best prediction?

Mark **A** for **j**

mark **B** for **k**

mark **C** for **i**.

40. Of **k**, **l**, and **m**, which is the best prediction?

Mark A for k

mark B for l

mark C for m

41. Of m, n, and o, which is the best prediction?

Mark A for m

mark B for n

mark C for o.

42. Of n, o, and p, which is the best prediction?

Mark A for n

mark B for o

mark C for p

Possible predictions:

- j. If any duckling eats a cabbage worm, the duckling will be dead within six hours, and if a stomach test is performed within twelve hours after eating the worm, the results of the stomach test will show that the duckling has eaten at least one cabbage worm.
- k. If any duckling does not die within six hours after a given period, then it did not eat any cabbage worms during that period.
- l. Suppose six hungry Pintail ducklings are put for one hour in a cabbage patch containing cabbage worms and then put in a clean cage for six hours.
- m. If any do not die during that period, the results of the stomach test will show that these ducklings did not eat any cabbage worms.
- n. If one Mallard duckling is selected at random from each of ten different broods, and all ten ducklings are kept away from cabbage worms for a twelve-hour period, then none will die during the last six hours of the twelve-hour period. If one Mallard duckling is selected at random from each of "u six different broods, and each selected duckling is fed a cabbage worm, all six ducklings will be dead within six hours.
- o. Suppose twelve hungry, randomly selected Canvasback ducklings are turned loose for one hour in a cabbage patch containing cabbage worms and then put in a clean cage for six hours. If each die during that period, the results of the stomach tests will show that each has eaten a cabbage worm.
- p. If a group of ten healthy Canvasback ducklings that would probably live if not fed cabbage worms is randomly split in half, and each half is treated the same except that one group of five eats cabbage worms, then the worm-fed ducklings will die within six hours and the other ducklings probably will not.

SECTION VI

Items 43 through 46 provide situations in which a definition is called for. From the three definitions that follow each description, pick the one (**A, B, or C**) that best gives the meaning.

43. "That's a nice stock car you have there, Bill," his mother remarked.

"Stock car!" Bill exclaimed. "That's no stock car. Did you ever see a car in a dealer's showroom with bumpers made out of heavy pipe? Do the automobile manufacturers turn out cars with no fenders? Of course not."

Bill's mother then asked, "Just what do you mean by 'stock car'?"

Of the following, which is the best way to state Bill's notion of a stock car?

- A. A stock car is an automobile that is, for the most part, made of standard parts put out by automobile manufacturers, but which might have missing fenders and special bumpers.
- B. A stock car is an automobile that has fenders and does not have bumpers made out of pipe.
- C. A stock car is a standard automobile, as turned out by the factory and sold to the public.

Answer:

A		B		C	
---	--	---	--	---	--

44. "It certainly is a stock car," said Joan. "It has an ordinary engine that hasn't been changed since it came off the assembly line. That alone makes it a stock car and that's all that matters."

Of the following, what is the best way to state Joan's notion of a stock car?

- A. A stock car is an automobile that is, for the most part, made of standard parts put out by automobile manufacturers, but which might have the fenders missing and special bumpers.
- B. A stock car is an automobile with a standard engine.
- C. A stock car is where the engine is standard.

Answer:

A		B		C	
---	--	---	--	---	--

45. "What are you making with that dough?" asked Mary's father. "Dough!" Mary exclaimed. "Did you ever see anything made with yeast that was baked immediately after it was mixed? Naturally not," she said as she put the mixture into the oven immediately after mixing it. "Therefore, it's not dough." "What do you mean by 'dough'?" Her father asked. Of the following, which is the best way to state Mary's notion of dough?

- A. Dough is a mixture of flour and other ingredients, including yeast.
- B. Dough is a mixture of flour and other ingredients, not baked immediately.
- C. Dough is a mixture of flour and other ingredients, often baked in an oven.

Answer:

A		B		C	
---	--	---	--	---	--

46. "Why, of course that's dough," said Jim. "You're making cookies, aren't you? It's not even called dough unless it's used for cookies, "Of the following, which is the best way to state Jim's notion of dough?

- A. Dough is a mixture of flour and other ingredients not baked immediately unless used for cookies.

- B.** Dough is a mixture of flour and other ingredients which is used for cookies.
- C.** Dough is a mixture of flour and other ingredients, which is used for cookies unless it's baked immediately.

Answer:

A		B		C	
---	--	---	--	---	--

SECTION VII

In items 47 through 52, someone is speaking, but in each case, there is an unstated assumption. An assumption is a statement that is taken for granted. From the choices that follow each item, select the one (**A, B, or C**) that is most probably the unstated /unspecific assumption. Consider each item by itself.

47.

MR. DOBERT: The fact that Gallton's children have been forced to work explains their misbehavior.

- A.** Children who have never been forced to work behave properly.
- B.** Children who behave improperly have been forced to work.
- C.** Children who have been forced to work behave improperly bird.

Reminder: Select the one (**A, B, or C**) that is most probably the unstated assumption.

Answer:

A		B		C	
---	--	---	--	---	--

48.

MRS, DOBERT: What we should do is not make them work. Then they would be all right. I know it.

- A.** Children who are forced to work will misbehave.
- B.** Children who are not forced to work will behave properly.
- C.** Children who behave properly have not been forced to work.

Answer:

A		B		C	
---	--	---	--	---	--

49.

MRS. ALGAN: We ought to make them work. That will cure them.

- A.** Children who aren't forced to work will misbehave.
- B.** Children who are forced to work will behave properly.
- C.** Children who behave properly have been forced to work.

Answer:

A		B		C	
---	--	---	--	---	--

50.

MR. ALGAN: The explanation of the misbehavior of Gallton's present-day crop of youngsters is a simple one. These children have been severely punished at some time or other. That's the trouble.

- A. Children who have been severely punished misbehave.
- B. Children who misbehave have been severely punished at some time.
- C. Children who haven't been severely punished behave properly.

Answer:

A		B		C	
---	--	---	--	---	--

51.

MRS. DOBERT: Their behavior can be explained by realizing that most of these youngsters have never been punished.

- A. Children who are punished behave properly.
- B. Children who behave improperly have never been punished.
- C. Children who have never been punished behave improperly.

Answer:

A		B		C	
---	--	---	--	---	--

52.

MR. DOBERT: What we should do is never punish them. That would take care of things.

- A. Children who behave badly have been punished at some time.
- B. Children who are punished will misbehave.
- C. Children who behave properly have never been punished.

Answer:

A		B		C	
---	--	---	--	---	--

UNIT 5B: good vacation**BEFORE THE CLASS****AT HOME****AFTER THE CLASS**

A good vacation, Present perfect continuous and present perfect.

United: 5B**BEFORE THE CLASS****AT HOME****AFTER THE CLASS**

What I know (lo que sé de esta gramática, vocabulario, del tema, etc.)	What I want to know (lo que quiero aprender en esta parte de la unidad etc.)	How will I find out? (Qué voy a hacer para aprender más, aparte de lo que recibí en clase, etc.)	What I have learned? (al finalizar la clase que aprendí) (llenar al final de la clase)
I think it is easier for me to understand the theme of the present perfect vs simple past than this theme because I get a bit confused but I know that for the present continuous effect we use have or has and been and more the ing. On the subject of vacations, I know a bit of vocabulary such as destinations, busy street, geography, safe resort and more.	I would like to learn more about the difference between these two topics not necessarily with reference to the English but more in the structure of each one and have less error when writing.	I will try to practice more in the video that the teacher showed us in class and also the exercises that we have done in class: https://www.youtube.com/watch?v=HRI2HDCy_8o	I learned new vocabulary such as exotic, vibrant city, tropical beach, crowded market and more and I also learned about how long we should use it with present perfect, present perfect continuous and past simple to ask about the duration of an activity, verbs like ser, have, know and like are not normally used in the continuous form. Also practice with these videos: https://www.youtube.com/watch?v=Lv3dgXjAru8 https://www.youtube.com/watch?v=kLxnRQZrhc0

Besides, I looked for more examples and other videos:
<https://www.youtube.com/watch?v=D3BYiSPV2A8>

& PRESENT PERFECT PRESENT PERFECT CONTINUOUS

Present Perfect



**Present Perfect
Continuous**



S + have/has + V3

S + have/has + been + V-ing

Finished actions

Unfinished actions

E.g. The kids have played for 2 hours

E.g. The kids have been playing since morning.

One Minute Paper

Topic: _____			Name: _____		
What are 3 words that come to mind when you think of this topic?					
1.		2.		3.	
What are 2 questions you have about this topic?					
1.			2.		
What is 1 simile/metaphor you would use to describe this topic?					

What is BULLYING?

(WRONG)

3 words

unjustice
uncomfortable
inappropriate

2 Questions

- Have you ever been a bully?

- Have you ever seen someone being bullied?
(Did you help him/her?)

1 Comparison

How does bullying feel?

Bullying is like a vise because it gets tighter, the more you pull.

Title ^{- Be specific}

Date

→ Keywords/Vocab

→ Questions

→ Comments

→ Big Ideas

Primarily taken
after class

· Fewer words

· Visuals & symbols
can be useful

→ Main Notes

· Primarily taken during class

· Leave space when possible
to add details later if necessary

· Diagrams, charts, doodles, symbols, etc.

· Bullet points

· Outlines

Abbreviations, Initialisms, Acronyms, etc.

→ Summary

· Completed after class
and sections above

CORNELL METHOD OF NOTES

TOPIC: SOCIOLOGICAL IMAGINATION

RECALL FROM LECTURE NOTES FROM LECTURE.

Sociological
Imagination

C. Wright Mills

A gay couple
unable to marry
because of public
policy

Personal troubles
linked to
Public Issues.

↳ Experience vs social
issues.

- Ethnicity and
policy of society

Personal vs
public

-
- What is the structure of the society? Council plus state govt plus federal govt: 3 layers of liberal: conservative
 - Who is in this society?
 - urban, medium density
 - mainly white.
-

The individuals
interaction with
the institutions

Personal Troubles

- biography of the individual
- a local existence

Public Issues

- institutions affecting the local

C Wright Mills wrote about the Sociological Imagination in 1950s. This links the personal troubles with public issues. A SUMMARY OF NOTES

Wrappers

When did you start preparing for the exam? (Choose one option)

- (A) I have been regularly revising since the start of the year
- (B) About 2 weeks before the exam
- (C) About 1 week before the exam
- (D) The night before the exam
- (E) I didn't prepare

How did you prepare for the exam? Circle the strategies you used to prepare for the exam.

Read notes	Created own notes	Completed chapter review questions	Completed online quizzes
Studied with a friend or group	Created flash cards	Asked someone test you	Other: _____

What types of questions were the most challenging for you? Why?

Type of question	Why did I find this question challenging?
Eg. Drawing graphs	I don't know when to draw a column graph and when to draw a line graph.

Name 3 things you will do differently for your next exam.

- _____

How can the teacher help you with the next exam?

- _____