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Critical Thinking Development Program in EFL learning*

Programa de Desarrollo del Pensamiento Crítico en inglés como idioma extranjero

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ABSTRACT

This is an experimental and quantitative study in the field of Linguistics applied to education attempts to determine the influence of the Critical Thinking Development Program, through a conference-like course aided by computers, on learning styles, linguistic competences, types of thinking, and the activation of intelligence, over one semester. Specifically, this study tries to prove that learning styles exert a certain influence on critical thinking, as well as on linguistic competences, emotional intelligences and leadership abilities. Hence the methodology is based on the cognitive paradigm which helps university learners develop Constructivist and Interactionist strategies to obtain information in the computer lab in order to generate and construct their own learning and knowledge. The sample of 20 university students studying English as L2 was exposed to the computer to obtain information about a specific topic to be analyzed and presented orally in the group, and in writing. Students had to develop collaborative learning with their classmates to eventually construct knowledge. In addition, values and attitudes were internalized and reinforced, and the CHAEA Questionnaire was used to establish the types of learning styles students used at the beginning and at the end of the semester. Results from the statistical data obtained in Pre-tests and Post-tests were presented in tables, which helped to draw conclusions related to types of thinking, linguistic, cognitive and metacognitive strategies, emotional intelligences and to leadership and learning in general.

Keywords: Constructivism, interactionism, collaborative learning, critical thinking.

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RESUMEN

Este estudio experimental y cuantitativo en el área de la Lingüística Aplicada a la Educación, está dirigido a determinar la influencia que un Programa de Desarrollo del Pensamiento Crítico, a través de un curso estilo conferencia con apoyo de computador, tiene en el desarrollo de los estilos de aprendizaje, de las competencias lingüísticas, tipos de pensamiento y activación de la inteligencia, durante un semestre académico. Específicamente, este estudio trata de probar que los estilos de aprendizaje tienen influencia en el Pensamiento Crítico como también en las competencias lingüísticas, inteligencia emocional y habilidades de liderazgo. La metodología se basa en el paradigma cognitivo que ayuda a los estudiantes universitarios a desarrollar estrategias Constructivistas e Interaccionistas y obtener información desde Internet para generar y construir sus propios aprendizajes y conocimientos. La muestra, de 20 alumnos universitarios que estudia inglés como L2, asiste al laboratorio de computación para obtener información en relación a un tópico específico, el que luego es presentado en forma oral y escrita ante sus pares. Los estudiantes desarrollan el aprendizaje colaborativo y estilos de aprendizajes de nivel superior para adquirir conocimientos e internalizar valores y actitudes. Se aplicó el cuestionario CHAEA para conocer los tipos de aprendizaje utilizados al inicio y al término de la investigación. Los resultados obtenidos en los pre- y post-tests se presentaron en tablas, los que ayudaron a elaborar las conclusiones relacionadas a los tipos de pensamientos, estrategias lingüísticas, cognitivas y metacognitivas, inteligencia emocional, liderazgo y aprendizaje, en general.

Palabras clave: Constructivismo, interaccionismo, aprendizaje colaborativo, pensamiento crítico.

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INTRODUCTION

This is an experimental and quantitative study which examines a Critical Thinking Development Program (CrThDPr) through a conference-like course aided by computers, among L2 university students. It attempts to find out the different learning styles which can be developed by university students.

This study will help students enhance their learning process, get cognitive and metacognitive strategies to develop critical thinking, strengthen their learning styles, values and attitudes, intelligence, and personality which can gradually trigger a new type of person with new intrapersonal and interpersonal intelligences or multiple intelligences to assist their cognitive and metacognitive strategies, with new fields of interest that can make them act differently.

This section includes the objectives of this study and the theoretical background with the cognitive paradigms which will help learners develop their intellectual capacity through Critical Thinking. This descriptive study arises from the effects of learning styles applied to a Critical Thinking Development Program, through a conference-like course assisted by the computer. The activity is based on the the general and specific objectives to know the effects of learning styles from different viewpoints and the effects of critical thinking on argumentative tests, intelligence and leadership.

1. OBJECTIVES

a. *General Objectives:*

1. To evaluate the learning styles L2 students use, when developing linguistic and cognitive competences, before and after facing the Critical Thinking Development Program (CrThDPr) through a conference-like course, assisted by the computer.
2. To evaluate the different effects that critical thinking has on the students' cognitive abilities.

b. *Specific Objectives:*

1. To discover if CrThDPr exerts an influence on reading.
2. To discover if CrThDPr exerts an influence on writing.
3. To discover if CrThDPr exerts some influences on orality.
4. To discover if CrThDPr exerts an influence on personality.
5. To discover if CrThDPr exerts an influence on leadership.

2. HYPOTHESES

1. The more L2 students read the more they learn and understand the texts fully.
2. The more students apply different specific learning styles, the faster they remember, recover and apply the information when speaking fluently and spontaneously.
3. The more L2 students write, the more they improve formal written texts.
4. The more collaboratively L2 students work, the more they achieve spontaneous changes in leadership.

3. THEORETICAL BACKGROUND

The new era of learning and thinking has shown that the latest generations of students are different from those of the 20th century, in learning, knowledge, attitudes, values, personality and learning styles. There are many reasons for these changes. Globalization, technology, neuroscience, psychology and education -to name some, stimulate the new trends connected with world progress and the welfare of mankind, and it has shown the world that human beings should be concerned with solving the problems of the planet; technology has turned people into new masters in learning, education and knowledge and has

provided new ways to face life and become more conscious of the changes, both in the environment and in ecology and new advances in the different fields of knowledge; technology and knowledge have made students aware of their learning so that they become more creative and innovative. Although not all countries have been conscious of these facts, some changes have been observed in attitudes, values and personality. Furthermore, students are more open to learning. They want to become professionals or technicians to be financially independent; they want to live in the present without postponing their interests, etc. These ideas produce some problems in education; it is well known that adolescents have changed and their behaviour shows us that we adults are acting in the same way as we did ten years ago.

The present era of learning and reasoning makes learners generate and construct their own information and knowledge to enhance their thinking processes according to their learning styles, to use metacognitive processes, such as analysis and problem-solving (Knowles, 2004).

The first decade of this century is ending, so Education, Psychology, Linguistics, Neuroscience and Sciences in general, can complement the students' interests to meet their needs. At present, educational trends aim at giving elementary, secondary and university students the opportunity to learn how to read and to reason, to originate their own ideas and construct knowledge either in formal or informal education**.**

Some researchers on critical thinking, technology and learning styles have shown that learners' attitudes and knowledge have relevant roles. As cognitive styles have become significant and have had new implications in methodology, learning is likely to enhance the students' attitudes and produce more intellectual satisfaction. Therefore, it is relevant to know the effects on the students' roles and strategies developed, and the way the learning guide uses a cognitive methodology in order to make them feel more comfortable and confident (Cartes *et al.* 2005a). Learners who are able to build connections between the information and knowledge develop cognitive and metacognitive strategies to control their thinking, and are responsible for their own learning. Learning strategies involve plans or mental activities, and are used to acquire, retain, and retrieve different kinds of knowledge; in other words, they can include some activities, such as acquiring, selecting, organizing, recovering information, relating and using the new material to keep and retain the information in the memory in order to retrieve different kinds of knowledge, such as declarative (knowing that...), procedural (knowing how...), and conditional knowledge (knowing when and why...). It is possible to process the information and learning, basic elements to awaken intelligence and critical thinking.The learning guide's main roles consist in organizing the group in the computer lab and in workshops, as well as evaluating every student on a weekly basis, presenting the feedback to the group because the other learning guide's roles have been assigned to students.

This study presents the results of a Critical Thinking Development Program (CrThDPr) through a conference-like course assisted by the computer on learning styles, linguistic competences (reading, speaking and writing), on Emotional Intelligence (EI) and Leadership. These activities are based on cognitive methodological perspectives which lead to a critical/reflexive research paradigm, starting from a process of searching for information, discovering knowledge through collaborative learning, and connection to cross-cultural and longitudinal observations. In other words, it is necessary to establish the effects of the CrThDPr by using the Constructivist and Interactionist (Vygotsky, 1978; Piaget, 1982) paradigms. This program can be developed through the conference-like course,via computer, where the students' roles are complemented by those of the teacher. The students develop the teacher's roles and the teacher becomes an expert as a classroom organizer, on formative evaluation and presenter of students' feedback, because learning has become more important than teaching, so students build knowledge through their own reading, speaking and writing, backed up by the computer.

Moreover**,** the 21st century is known as an era of cognition, learning, thinking, reasoning, intelligence and learning styles, among other educational contents which have become important variables in research papers; that is why most of the studies have been focused on cognition, learning styles, and learning strategies to discover their effects on university students' learning styles (Kolb, 1994; Schmeck, 1998; Cartes *et al.* 2004). Cognitivism (Ausubel, 2000) emphasizes mental processes and devotes attention to perceiving, thinking, remembering, analyzing and solving problems because learning strategies can be both cognitive and metacognitive.

According to different research papers, learning styles are defined as: the process or predispositions of an individual to receive and process information in a particular way or combination of ways (Sarasin, 1998) or the cognitive, affective, and physiological factors which are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment; or the complex manner and conditions under which learners most efficiently perceive, process, store, and recall what they are attempting to learn" (Gardner, 1993). These definitions include general and specific information and characteristics. The students are aware of their learning and improve their own strategies because they have made an effort to learn and internalize them. With this information in mind, the learner can develop personal dimensions, assessing personality influence on one of the types of approach already considered during their learning, in a more holistic approach, in which learning strategies help them enhance understanding; These strategies help them promote a more positive environment in which the student is the center of learning. In this way, the learner can acquire and integrate information to be developed into knowledge. The objectives and results of this research will reveal other effects.

3.1. *Dimensions of learning styles and instructional preferences:* It is possible to consider the dimensions of learning styles through the models of approaches.

– *Personality dimension:* assesses the influence of one's personality according to the way one acquires and integrates the information.
– *Information-processing:* in which a student prefers a cognitive approach to understand and acquire information.
– *Social interaction:* to know how learners interact with their peers to work collaboratively, so that learners can be identified as independent/dependent, collaborative/competitive, participant/avoidant.
– *Multidimensional and instructional preferences* depend on the environment approach for learning.

R. Felder's dimensions of learning (1993) consider the ways to answer five questions:

a) What type of information learners prefer to perceive: *sensory* (sights, sounds, physical sensations, or *intuition* (memories, ideas, insights).
b) Which modality in sensory information is effectively perceived: *visual* (pictures, diagrams, graphs, demonstrations) or *verbal* (sounds, written, or spoken words and formulas).
c) Which type of informational organization they feel more comfortable with: *inductive* or *deductive* principles.
d) How they prefer to process the information: *actively* (through engagement in physical activity or discussion) or *reflectively* (through introspection).
e) How they progress: *Sequentially* (in a logical progression of small incremental steps), *globally*, or *holistically*.

In other words, the following dual dimensions of this modality include the sensory and intuitive information perceived, the modality of sensory and intuitive information, the organization of the information, the active or reflective type of information, and its logical progression. These dimensions (sensory/intuitive, visual/verbal, inductive/deductive, active/reflective, and sequential/global) are a continuum and not categories. A student's preference on a given scale (e.g. for inductive or deductive presentation) may be strong, moderate, or almost nonexistent, may change with time, and may vary from one subject or learning environment to another.

Kolb (1994) explains that the person who uses reflexive observation can develop an active experimentation, considering learning as a way to use cognitive and affective dimensions because he connects the learning cycle as a relevant principle to learning styles. He includes learning as a core principle as a four-stage cycle of learning and a four-type definition of learning styles: in which

immediate or concrete experiences provide the bases for observations and reflections, which are assimilated into abstract concepts producing new implications for action which can be actively tested, in turn, creating new experiences. In other words: the four-stage cycle contains: 1. Concrete experience. 2. Reflective observation. 3. Abstract conceptualization and 4. Active experimentation, which lead to four definitions of learning styles: 1. Diverging, 2. Assimilating, 3. Converging, and 4. Accommodating.

R. Schmeck **(**1998) considers that every learner, in an appropriate educational framework, can develop two kinds of learning: one related to information and knowledge, and the other in relation to the thinking processes. This means that the student who has activated learning strategies can learn how to analyze, solve problems or make decisions when he has previously learned to reason inductively or deductively. He can memorize the contents if he analyzes a text; he can learn how to read inductively or deductively in order to develop reading comprehension, writing and oral production. In some of his studies, Schmeck has concluded that every person who develops learning strategies and learning styles during his/her life, can exert a certain influence on personality. Hence, this researcher defines three different learning styles, which are characterized specifically in relation to learning strategies and learning levels. They are: deep- or high-order level in which the student can conceptualize by abstracting, analyzing, relating, and organizing contents which can produce these types of high-order strategies. The student who develops Elaborate Style uses a type of personalized strategy which can directly facilitate the use of an upper intermediate level, that is to say an elaborate-order of strategies. The third type has to do with the Surface learning style. A student's learning style implies a difference in his personal learning style because it exerts an influence on the type of developed strategies. Cartes *et al.* (2005b) state that in the development of critical thinking there are four types of learning styles to be developed: an advanced thinking style, a high- intermediate or high-moderate learning style, a surface-learning style, and a repetitive-learning style, derived from memorization. Moreover, values and attitudes also contribute to developing new strategies which will help evolve to information previously processed.

H. Gardner (1995) states the difference between the theory of MI (Multiple Intelligence) and the concept of learning style. The concept of learning style helps to designate a general approach that an individual can apply equally to every conceivable content, in opposition to intelligence, which is an intellectual capacity, with its varied processes, geared to a specific world content (such as musical sounds or spatial patterns; MI theory is a cognitive model that tries to describe how individuals solve problems and fashion products (Armstrong, 2003).

It is important to present the Critical Thinking Development Program in order to understand its influence on linguistic and cognitive competences.

3.2. *Critical Thinking Development Program through a Conference-like Course aided by computers* (Cartes, 2007a)

CrThDP puts into practice the new educational trends which develop mental processes in order to achieve learning strategies, not only by means of the Constructivist, Interactionist, and Collaborative Learning Theories but also through learning styles, values and attitudes, among others.

General Objectives	To discover if Critical Thinking Development in a conference-like course, via computer, affects learning styles in L2 university students who study English.
Specific Objectives	a) To improve interpretive and critical types of reading, via computer. b) To enhance writing. c) To foster fluency and spontaneous orality.
Weekly Schedule	1 hour in the computing laboratory to search for information about a macro-topic and micro-topics in order to develop cognitive and metacognitive strategies and a two-hour workshop so that each student can present an analysis or problem-solving every week, while the learning guide evaluates each student weekly, either quantitatively or qualitatively.
Ideal numbers of students	Twenty, because every student must present an analysis or problem-solving in the two-hour class and, before finishing the class, the learning guide must present the feedback according to the scores obtained in the oral presentation, and to the quantitative or qualitative assessment.
Information: macro-topics an micro-topics	The students suggest three macro-topics, one of which is selected democratically. This topic is subdivided into micro-topics; that is to say, if the selected topic is South, Central or North American Old Civilizations, the sub-topics to be presented weekly could be: Chilean, Peruvian, Brazilian, Argentinean civilizations with different variables, to name some of them.
Methodology	The methodology is based on the new trends in Education: Ausubel's ideas (2000) that students can generate ideas to construct knowledge; Vygotsky's (1978) social ideas imply that students can work collaboratively to improve their knowledge, attitudes and values in order to improve their personality traits; Gardner (1999) relates the eight types of

intelligences with the eight types of activities to develop critical reading/ writing and orality. Knowles, 2004, emphasizes that the computer helps learners to learn grammar, lexicon and cohesion. As the information changes into knowledge when presenting their conferences in the classroom, they have the opportunity to reproduce and internalize grammar, vocabulary and connectors. Over time, students gradually change their stuttering into fluent ideas while they are internalizing grammar, so the mistakes disappear and are replaced by fluent and spontaneous knowledge.

As mentioned previously, the learning guide's duties consist in organizing the work in the classroom, listening to the oral presentation of every student while the guide is evaluating them, explaining the feedback with the mistakes made by the group of students, and expressing the types of thinking they have been developing during the semester. This information helps them to develop their metacognition and enhance their linguistic and cognitive competences.

Strategies to be developed

Students can develop cognitive and metacognitive strategies: analysis, problem-solving, decision making, debates, designs, or higher level scientific inquiry.

Values and attitudes

Values and attitudes are developed and evaluated by the students and the learning guide in every class. See Table 1 about values and attitudes which must be stressed and observed by the guide when they apply them spontaneously.

Learning Guide and students' roles

The teacher organizes, evaluates and participates as another student in the class, he/she also checks the students' strategies, values and attitudes. The students apply the teacher's old roles, work in the lab, write a summary with the information which they will present in the classroom, so as to construct knowlege and partially evaluate their classmates.

3.2.1. *Rubrics to know, recognize, understand and evaluate the different types of thinking*

Retention of the Information Scores: 10-49	**Methodic Thinking Scores: 50-60**	**Elaborate Thinking Scores: 61- 80**	**Critical Thinking Scores: 81-100**
Students pay attention to the linguistic elements of the text. They read each word, but with a poor pronunciation. Then, they read groups of words and write a 200 word- paragraph, based on memorization. This person talks with many pauses, pet-words, and poor pronunciation. Readers do not make many mistakes because the ideas have already been learned.	Students attempt to center reading on cognitive elements, but without a logical sequence. They have enhanced vertical reading. They speak and produce many silences and use some para-linguistic elements. Mistakes in verb tenses. Lexical repetition. They only use three prepositions and do not use adverbs or adjectives. They show lack of coherence.	Students center reading on cognitive elements. They read vertically and write texts with an Introduction, Development,/ and Conclusion. They have really improved orality: They only use 2 or 3 paralinguistic elements; they use fluent language. They use correct cognitive and metacognitive strategies.	Students use critical reading to write texts. They use fluent and spontaneous orality; Their pronunciation is good and they develop correct use of cognitive and metacognitive strategies.

3.2.2.

Cognitive Values must be developed in the classroom, to be gradually internalized. Values become important because each value emphasizes an attitude which will help learners to accept life as it is, to be responsible for their activities at home, school and in the groups where they have to participate so that they can avoid problems in their lives. In this way, theory and action must be linked to improve cognitive learning. They feel interested in participation at home, in the classroom, at school and in society.

TABLE 1. Cognitive values, and attitudes to be developed in the classroom.

VALUES	TYPE	ATTITUDES
1. Commitment to learning and duties.	Intellectual	To succeed or be successful in life.
2. Positive reaction in everyday life.	Affective	To become optimistic.
3. Constant and spontaneous use of critical thinking.	Intellectual	To be creative and innovative.
4. Positive acceptance of individual and group differences (social, educational, racial, religious, political and economic).	Ethical	To live in harmony with minority groups.

VALUES	TYPE	ATTITUDES
5. Achievement of intrapersonal and interpersonal intelligences.	Psycho-social	To become emotionally intelligent, able to work alone and in groups.
6. Spontaneous intellectual commitment gradually achieved in relation to goals and personal improvements.	Intellectual-social	To be eager to improve and show intellectual advancement.
7. Acceptance of peace for oneself and others.	Ethical	To respect peace and the right to live.
8. Interest in creating new resources for the sake of the country and inhabitants.	Intellectual	To be creative and pro-active.
9. Admiration and respect for institutions, historical sites, cultural properties, etc.	Intercultural	To accept cultural diversity in the country and abroad.
10. Same opportunities for everybody (work, salaries, and education).	Ethical-social	To accept their rights in relation to gender, marital status, salary.
11. Commitment to ecology and nature.	Environmental-ecological	To become a collaborative agent to protect the environment.
12. Personal and global awareness for future money saving.	Pragmatic	To face the future with confidence to avoid future problems.
13. Civic care about any school and state community.	Civic- social	To become a responsible student and a good citizen.

Cartes, Nail & Larenas (2005). *Paideia* Nº 39.

4. RESULTS IN PRE -TESTS AND POST-TESTS

This section includes the results of this course tried on a sample of twenty university students who study English as L2 at the University of Concepción. During the first week, after becoming acquainted with the methodology of this program, they select the following macro-topic: National and International Tourism in different parts of America. The micro-topics developed were: Tourism in South America, such as in Chile, Brazil, Uruguay, etc. In this way, L2 students could develop reading, via internet, speaking for seven to ten minutes about the topic, and writing an analysis on the topic, suggested by the guide. Morever, they must apply their different learning styles in the conference in order to improve their language and critical thinking.

The CHAEA, a standardized questionnaire, was applied in March and July, with the following results:

TABLE 2. Types of Learning Styles, before the application of Honey-Alonso (2007) CHAEA to be applied in CrThDPr.

Sample: Frecuency	a) Pre-test Results	b) Post-test Results	c) Results from CrThDPr.
1	Reflexive.Active.Pragmatic	Higher-order Style	
2	Reflexive.Theoretical.	Reflexive- Active.Pragmatic.	Higher-level Style
4	- Low scores	Reflexive-Active	Higher-level Style
3	Reflexive. Active	Reflexive- Active.	Higher-level Style
4	Reflexive.Theoretical	Reflexive. Theoretical	Higher-level Style
6	- Low scores	Reflexive- Active. Theoretical	Elaborate-level Style

The first time the questionnaire was applied, most of the students obtained low scores in the different types of learning styles because they were not certain of them; they wondered which one they had to select in order to write or which answers were better for them to check. As a result, everybody showed the four types of learning styles included in the Test, but with low scores (The scores over 15 points were considered acceptable and scores under 6 were considered low). During the semester, observable changes took place among the students' thanks to metacognition and the teacher's feedback, they were able analyze and solve problems; they tried to control the different variables which would help them process metacognitive strategies.They learned how to reflect by means of collaborative learning because they tried to develop inductive reasoning and, later, deductive reasoning. During the first month of research, a) learners used a repetitive style, which came from the memorization of texts found in the computing lab. b) in the second month, learners activated a surface style. c) they achieved a relatively sophisticated elaborate style between the third and part of the fifth month, d) finally, they developed a higher-level style with the characteristics previously mentioned. Students were interested in listening to their classmates' learning strategies and the way in which they orally exposed their metacognitive strategies in front of the group.

The CHAEA Questionnaire was also applied at the end of this course, with the following results: all 20 students activated Reflexive Learning Style: 15 students activated an Active Style, 3 of them marked Pragmatic Style, and 2 Theoretical Style. CHAEA did not help to recognize the real learning styles related to CrThDPr, students who developed critical thinking could develop: from a) repetitive- level to b) surface-level strategies and from c) elaborate or intermediate-order strategies to d) higher-order learning strategies to acquire

their metacognitive learning styles. The first two styles required linguistic strategies because learners focused the information on linguistic elements. It is possible to conclude that the linguistic effects which gradually took place in the students' linguistic competences (Reading, Speaking and Writing) changed into cognitive strategies.

TABLE 3. Types of Thinking developed.

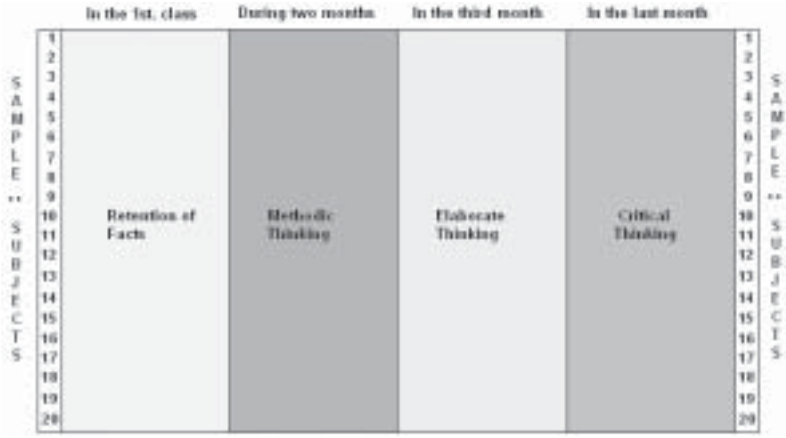


Table 3 shows the types of strategies activated through the Critical Thinking Development Program.

4.1. *Development of integrated linguistic and cognitive competences*

I. The following is an explanation of the paragraph related to the integrated linguistic and cognitive competences developed.

a) In the first class, students center reading on linguistic elements. They read the text horizontally or use Bottom-Up Reading in the lab.
b) From the next class on, they write a summary with the information found

and read in the lab, but they write one paragraph with one or two isolated ideas.

c) When speaking, they only read a summary of the text to present the ideas, but it is difficult to understand their oral presentations because of poor pronunciation.

II. For two months, they read more than two pages to obtain the required information, but they can understand a little more.

a) They write one paragraph with different types of isolated ideas.
b) They try to center the information on ideas and speak without a text in hand. They make many mistakes; they stutter and use many pet words and different extralinguistic elements.

III. After two months, they read about seven pages centered on ideas; they read vertically and creatively; they gradually develop Top-Down Reading.

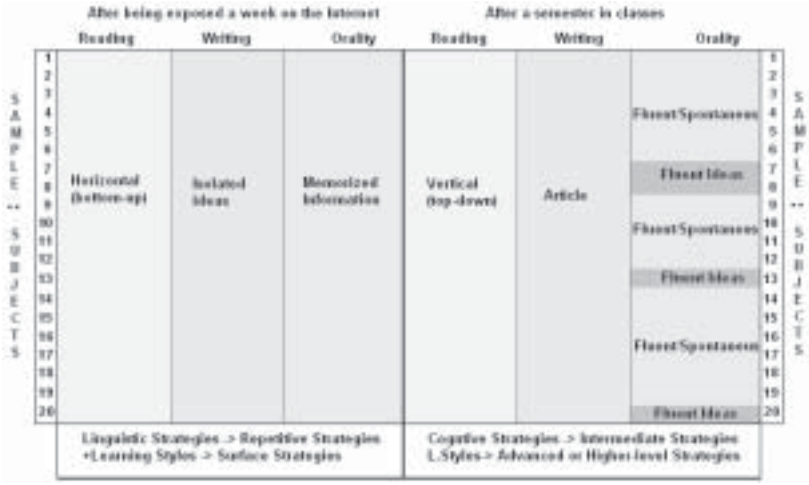
a) They write a text with two or three paragraphs, including an Introduction and the Development where they analyze each variable, to finish with the Conclusions.
b) Students speak rather fluently and with few mistakes and with only three or four pet words.

IV. After a three month period**,** most learners start reading vertically, and gradually use Top- Down Reading, centered on ideas.

a) They write a four/five-paragraph text to analyze or solve the problem about the specific sub-topic. It includes an Introduction, Development with different types of variables to analyze or solve a problem with the Conclusions.
b) When speaking, they gradually stop stuttering and using pet words; they begin producing short, but fluent texts to develop Critical Thinking. Later, they speak spontaneously, without reading or consulting notes. They produce one or two grammatical mistakes. Their learning styles help them develop and improve integration of linguistic and cognitive competences.

In conclusion, they gradually develop the different types of thinking: Retention of Facts, Methodic Thinking, Elaborate Thinking and Critical Thinking.

Table 4. Results of Learning Styles in Integrated Linguistic Competences: before and after the application of the Critical Thinking Program.



4.2. *Learning Styles developed through (A.1) Linguistic Reading and (A.2) Cognitive Reading*

Linguistic Reading is developed through Bottom-Up Reading: through the Memorization of Facts and Methodic Thinking, where they develop linguistic strategies because it is difficult for learners to recall the information in the construction of knowledge. At the beginnng of the course, they use a Repetitive linguistic Style or a False-linguistic Style, and later, a Surface Linguistic Style. At the beginning, they cannot write or speak a complete sentence due to the fact that they have centered reading on linguistic elements (such as syntax, phonetics, among others).

Linguistic Writing is out of context Styles since students try to write an article by repeating what they have memorized; Later, they try to write the information, previously read, in a spontaneous way by using the information they can recall, by means of brief ideas.

Learning Styles in Speaking come from the approach used in linguistic reading and writing. If they read horizontally, they are supposed to use sentences with an out-of-context Style. They center the oral presentation on the information, which becomes quasi-understandable. They know that this style can be improved if they read more to activate orality and work collaboratively with their classmates. The moment they start reading faster and vertically, they can recognize that their L2 oral production is facilitating their oral linguistic and cognitive competences.

Cognitive Reading and Cognitive Writing are focused on a cognitive type of reading and writing, based on a context-Style on reading and writing, because

learners have been centering their attention on ideas to develop cognitive and metacognitive strategies. The information obtained through reading has been transformed into knowledge, so they can generate their own ideas. They read vertically Top-Down and they read from five to fifteen pages faster. They can read and write easily to interpret or develop critical thinking, they start reading about five or more paragraphs and end up reading fifteen or more texts, depending on the metacognitive strategies they have developed up to that moment (analysis or in problem-solving). Their writing in-context style can lead to an inductive writing style or a deductive writing style.

The styles used in *speaking* are also based on linguistic and cognitive elements, due to the type of thinking they have tried to express, when developing critical thinking. So, they gradually used both a Linguistic Style and a Cognitive Style.

a) The linguistic style is based on memorized facts during the first weeks, and their orality is understandable. When they practise the methodic type of thinking, they use the oral language with brief sentences and many grammatical mistakes (tenses, nouns, lack of adjectives and prepositions, lack of clauses, etc.) It is difficult for the listener to understand their oral production because of the poor pronunciation.

b) The cognitive style is used after two or three months, when they start enhancing critical thinking.

TABLE 5. Effects of Learning Styles on Critical Thinking.

LEARNING ACHIEVEMENT **Information, via computer or printed texts + Collaborative work → Knowledge**				
Competences developed:	**Linguistic Competences**		**Cognitive Competences**	**→ Metacognitive Competences**
	Centered on Syntax, Lexicon and Pronunciation Reading/Writing/Speaking		Centered on mental processes: describe, compare, explain, etc.	Centered on argumentative texts: analysis, problem-solving, decision - making, debates
Learning Styles	ISOLATED Competences (R-W-S)		INTEGRATED Competences (R+W+S)	
Effects on Learning	on **Surface Learning**		**Intermediate Learning**	**Advanced Learning**
CRITICAL THINKING				
Types of Thinking Developed	of a) Retention of Facts		b) Methodic Thinking	a-b) Linguistic Types of Thinking
	c) Elaborative Thinking		d) Critical Thinking	c-d) Cognitive Types of Thinking
EI	Critical Thinking + Values+Attitudes			**→ EI** I.Intrapersonal I.Interpersonal
MIs	Critical Thinking + Values+Attitudes + Lesson Plan + EI.			**→ MIs**
Learning + Values + Attitudes + COLLABORATIVE LEARNING + CRITICAL TH. + IMs → LEADERSHIP				

Cartes, N. (2007b)

Table 5 shows the types of strategies activated through Critical Thinking, that is to say, the Critical Thinking Development Program.

As it has been mentioned previously, the CrThDPr contributes to developing two types of strategies: linguistic and cognitive strategies. The linguistic strategies include the initial type of learning through memorization and methodic thinking; the cognitive strategies develop elaborate thinking and critical thinking. From another point of view, cognitive strategies are shown through explaining, identifying, comparing, defining, among many others, while metacognitive strategies stimulate analysis, problem solving, decision making, debate, scientific enquiry, among others, which have effects on students' learning styles. Linguistic strategies activate individual learning, firstly shown in the repetitive types of strategies, and activate a surface type of learning . Cognitive strategies develop integrated lingüistic competences (Reading+Writing+Speaking) and activate intermediate-level strategies. Metacognitive strategies activate higher-level strategies: These general results are more complex and help to develop the different types of critical thinking.

Critical thinking is initially activated through the information obtained and read on the Internet, plus the students' intellectual capacity and perspectives. This information, obtained via computer, is turned into knowledge and is activated through collaborative learning. Moreover, critical thinking plus collaborative learning help students develop EI, MIs, and Leadership, over a period of time. Emotional Intelligence is expressed individually , as Intrapersonal Intelligence or in the group as Interpersonal Intelligence.

It is important to develop leadership in the classroom, as a result of collaborative learning and intelligences.These meetings become the best opportunities to meet each other and develop ideas in order to practise orality: emotions, values and attitudes and knowledge displayed in front of their classmates contribute to developing leadership.

4.3. *Types of Intelligence and Personality Traits Developed by the Group*

By means of observation, conversations, the application of N. Schutte's *et al.* (2001) questionnaire and other charts, the first types of intelligences achieved by students were Intrapersonal and Interpersonal ones, that is to say, emotional intelligence, which was observed in their friendly attitudes when working with others and specifically when using collaborative learning. These types of intelligences were activated due to their learning styles and language learning, among other activities gradually developed in the conference-like course to reinforce values, attitudes and integrate linguistic competences which have already been achieved (reading, writing, speaking). The easiest way to strengthen values and attitudes was cognitively through cooperative work. It was interest-

ing for the learning-guide to observe the way they showed creativity, innovation, and harmony in the group when learners subsequently enhanced reading, writing and speaking when achieving linguistic competences.

TABLE 6. Types of Intelligences developed in the Conference-like course.

Intrapersonal Intelligence Interpersonal	introspection, self-reflection, collaborative L, communication, person-to-person activities
Logical-Mathematical	self-reflection, logical, inductive/ deductive reasoning
Visual-spatial I	images and information, mental images, visualizes objects and ideas,
Verbal linguistic I	Spoken and written texts, debates, analysis, problem solving
Kinesthetic intelligence	drawings, writing on the board to explain, complemented by activities
Musical, rhythmic	beats tones in the lab, or when writing, music often produced by groups, make up and sing jingles to sum up some topics
Naturalist	weather condition, physical and natural features, philosophy of life, life's meaning, use information to reflect on it,
Existentialist	Spontaneous reflections about values, attitudes, and ideas

Intelligence and Personality Characteristics

The types of intelligence bring about typical personality characteristics. The majority of the students show themselves to be extrovert, optimistic, friendly, with an atmosphere of mutual trust and confidence, and freely give opinions. These students show a sense of responsibility; they are imaginative; proactive; innovative and creative; they can facilitate the way to act on their own and for the sake of others. They have the ability to face reality, understand emotional changes; show self- acceptance; friendship, and recognition of others. However, those who are not very responsible do not always come to class nor recognize certain values; they are not always aware of putting them into practice. In general, this group of students recognize that they have learned a lot in this

class (how to read, write and speak fluently and spontaneously), they feel different, they have made friends, and enjoyed working alone or in groups.

CONCLUSIONS

The results of this study have arisen from the effect of learning styles applied to the Critical Thinking Development Program through the conference-like course, assisted by computer, in order to develop L2. This work based on methodological perspectives from a critical reflective research paradigm started from a process of finding out, searching and questioning information to cross-cultural and longitudinal observations. The main objective was to evaluate the learning styles L2 students use, when developing linguistic and cognitive competences, before and after facing the Critical Thinking Development Program (CrThDPr) through a conference-like course, assisted by the computer.

1. This program revealed multidimensional and instructional learners' preferences in relation to the way they had perceived information, the modality of sensory memory, verbal principles, the organization of reasoning, from inductive to deductive, applied in learning, thinking and reasoning. The processed information from active to reflective used in a logical progresion, either sequentially, globally or holistically; it contained cognitive or metacognitive strategies developed through collaborative learning and helped students activate and express feelings of friendship and emotional intelligence.

2. The results have contributed to establishing the learning styles developed during Critical Thinking Development, via computer, which reinforced the students' learning styles. Students who participated actively in class developed a High-order or Deep-order Learning Style. Those students who participated actively did not develop spontaneous orality, but activated an Elaborate or Moderate learning Style. Surface learning and Repetitive learning styles were not observed in the final oral presentations.

3. The information available on the Internet added special demands to reading, writing and speaking. In reading, they fostered Vertical or Top-Down Reading. In Writing, isolated sentences developed into paragraphs and articles; objectives and general ideas were included in the Introduction of the essays; in the Development they analyzed some variables previously considered; and in the Conclusion students stated those variables to answer the question, by analyzing, restating or refusing the hypotheses. In speaking, learners increased their oral production from conscious grammatical use of the language to spontaneous production.

4. As the linguistic use of the language improved, some learners realized that they had developed cognitive processes, required in the input, to improve reading, writing and orality; therefore, they had developed metacognition.

5. These learners processed correctly the different types of variables during the analysis or problem-solving, which came from the different types of reasoning, with exceptional deep characteristics or high-order learning style.

6. Learning styles clearly exerted an influence on reading, writing, orality and personality. Moreover, L2 critical readers, needed to develop some specific learning styles, not only to understand the information, but to remember and recover it, in order to speak fluently and spontaneously.

7. The more the students worked collaboratively, the more spontaneous changes in personality and some types of intelligence were observed. It was really easy to check the students'correct behaviour and attitudes in the computing lab and in the classroom.

8. Students developed different types of thinking in L2. From the first class on, they were anxious to achieve retention of facts and methodic thinking, both based on the information and centered on linguistic elements. They made progress from top-down reading and lower-order styles to higher-order styles; that is to say, from linguistic to metacognitive strategies. So when they really developed higher-intermediate style and deep-order style, they knew that nobody would be left behind in their learning. They recognized they had made progress.

9. Due to their commitment to learning, their attitudes changed; it was not easy for the students to recognize that they could act and look differently, expressing a real change in their leadirship potential.

The following hypotheses were accepted as valid:

1. The more L2 students read the more they learn and understand the texts fully.
2. The more students apply different specific learning styles, the faster they remember, recover and apply the information when speaking fluently and spontaneously.
3. The more L2 students write, the more they improve formal written texts.
4. The more collaboratively L2 students work, the more they achieve spontaneous changes in leadership.

The final conclusions lead us to state that this type of work has made the students learn how to learn, learn how to reason, learn how to act , and learn how to be and live in groups.

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