# The Impact of Structured Reading Lessons on the Development of Critical Thinking Skills

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**Abstract**

This study investigates the impact of structured reading lessons on the development of critical thinking skills in college students learning English as a foreign language. This study took place during the first level of English in their academic program. Two groups of students were included in the study. One group received traditional reading instruction while the other group had structured reading lessons that intended to create opportunities to operate in higher order thinking levels. The gains in critical thinking skills were assessed on the basis of each group's comparative results on the California Critical Thinking Test (Facione, 1995) between the pre-test and post-test. Results showed that students who had structured reading lessons did not improve in a significant way compared to the results of the control group in the post-test.

## 1 Introduction

This study adds to the quantitative empirical body of literature in the area of instruction on critical thinking skills. Some studies have attempted to prove the effect of models that consider the development of critical thinking skills (Hendrix, 1995; Nieto & Saiz, 2008; Shepherd, 1998). Several studies have shed light on what aspects are important while attempting to implement instructional practices in educational settings. The present study acknowledges contributions in the field and attempts to focus on the development of higher order thinking skills through structured reading lessons as part of an English as a foreign language program for college students in a South American country. The importance of structuring opportunities for learners to relate more actively with the new language has been stressed (Swain, 1985) as well as the need to develop critical thinking skills through interaction (Duffy, Dueber, & Hawley, 1999).

## 2 Literature review

### 2.1 *Critical thinking skills and college education*

Identifying the importance of critical thinking skills in postsecondary education has been a topic analyzed extensively in education. Pascarella (1989) analyzed the impact of attending college in the development of critical thinking skills. He took two groups, one, high school graduates and the other, college freshmen, and compared their results on a test after a year. Those students in college obtained higher scores than the graduates from high school. Moving a step away from the classroom, other studies have examined other college related activities. Gellin (2003) carried out a meta-analysis of several studies that had explored the effect of life on campus on undergraduate students. In this study, Gellin found that students who were actively involved in activities such as

clubs and organizations, and who interacted with faculty and other students experienced significant gains in critical thinking in comparison to those other who were not involved.

Pascarella & Terenzini (1991) synthesized two decades of studies on the impact of college on fostering critical thinking and reached some important conclusions. They found that learning experiences which promote critical thinking skills have a positive impact on cognitive development. However, they also realized that there were significant differences among universities regarding emphasis on processes and resources and their efforts on maximizing students´ learning.

Other studies have focused more specifically on behaviours and types of activities commonly found in college settings. Smith (1977) conducted an exploratory study at the college level to observe the relationship between certain classroom behaviors and the development of critical thinking. She found that the most positive behaviors were student participation, encouragement and peer-to-peer interaction. Gokhale's (1995) study also explored the benefits of collaborative learning on the development of critical thinking skills. This study showed that the enhancement of these skills is possible through the type of interaction developed in groups through discussion, clarification and evaluation of other's ideas. However, it also suggests that teachers need to understand that for this collaboration to be effective, they need to see teaching as an opportunity to enhance students' ability to learn as well as to provide meaningful and engaging experiences in the class.

## 2.2   Language learning and skills integration

Integrating critical thinking skills with the instruction of English or any other subject (e.g. science) has been a widely studied and analyzed issue (Met, 1994; Huntley, 1998). Some researchers have attempted to explain how this integration can be made possible. Marzano (1985) points out the importance of considering a unified whole which can encompass not only critical thinking skills, but also learning-to-learn and traditional curriculum content. The cognition and behavior model that Marzano used was based on Anderson's (1983) theory of cognition, and suggested the need to structure instruction through learning-to-learn strategies and to make connections with basic beliefs. In order to understand how to structure this instruction, it is necessary to explore some characteristics of the cognitive development of humans. Bloom (1956) and his group of educational psychologists define six levels of cognitive development in his taxonomy of the learning domains, each increasing in difficulty. The most basic category is called knowledge, and it is at this level that Marzano's critical thinking or reasoning skills operate. Beyond the knowledge category, thinking processes get more complex. Categories such as comprehension and application precede the higher order thinking levels called analysis, synthesis, and evaluation. At these levels people are expected to be involved in active cognitive manipulation of information.

Bümen (2007) discussed the effects of Bloom's original taxonomy and the revised versions, as well as the major changes of the new taxonomy. This revision was carried out by Anderson & Krathwohl (2001), who were interested in incorporating new knowledge into the taxonomy. These researchers defined a two-dimensional framework. In this new framework there are two categories: knowledge and cognitive processes. In addition to restructuring knowledge and the cognitive processes, the main elements added to the taxonomy are the new category "metacognitive" and the consideration of "synthesis", now referred to as "create," which is the highest category. In the revised taxonomy described, the different levels should interrelate with the means in which teachers provide the activities they include in their lesson plans.

## 2.3   Critical thinking skills and the English language classroom

Lazere (1987) makes a point when talking about English studies (e.g. the English language classroom) as a place where learners can gradually explore informal logic or the application of principles of reasoning to everyday situations. However, it is important to mention that the English classroom is not the only place where skills' application can be activated. There are many other academic areas that can serve this purpose. Nonetheless, the English classroom is an appropriate

place to begin. Lazere also highlighted the role of literature in introducing critical thinking at the higher education level. This is due to the number of cognitive processes linked to reading literature (e.g. narration) and the higher levels of understanding and analysis required for comprehension (Lipman, 1991). Keeping this in mind, it is pertinent to consider how this component is relevant to the English classroom. Unfortunately, literature has been limited in most textbooks to short narrations (Schulz, 1981). Yet, the essence and complexity of narrative and other types of short texts can be seen in the classroom. Furthermore, reading is a skill that teachers can use to expose learners to the critical thinking progression. Thus, the level of complexity of the tasks will increase the demand for analysis and synthesis of the information. Through reading exercises, teachers can involve students in finding analogies and discovering relationships, as well as in determining the relevance of two pieces of information to each other (Potts, 1994).

## 2.4   Models for teaching critical thinking skills and new approaches to instruction

Several studies have been carried out to establish which elements should be included in the teaching of critical thinking, as well as which models promote the development of these skills. Halpern (1998) defined four components for teaching critical thinking skills to promote transfer to other contexts and areas. The first component is related to the instruction and practice of critical thinking. The second component involves dispositions to engage in deep thinking. The third component is the structural component, which refers to the need of making problems relevant, of using real-life like tasks, of offering corrective feedback, and of promoting effective elaboration of information. These are intended to facilitate transference to other situations. The fourth component is the use of metacognition. According to Halpern, each component should be integrated into lessons in order for students to effectively transfer critical thinking skills.

Nieto and Saiz (2008) studied the efficiency of the structural component of Halpern's model. They applied the model to a program for improving critical thinking among university students in which one experimental group followed the guidelines of Halpern's structural component and the other experimental group received instruction in the same skills but without emphasis on the structural aspects of the arguments. Also, they received fewer examples. The control group did not receive any instruction in critical thinking. The characteristics of instruction in the experimental group that followed Halpern's component included a greater number of examples to explain the skill and exercises to practice it, more realistic exercises, and corrective feedback. The results show that in relation to the test that measures critical thinking skills, there were no major differences between the three groups. However, in the tests about critical thinking beliefs and analysis of arguments, both experimental groups had similar results and they were better than the control group. Hence, the results did not show significant improvement through the use of Halpern's structural component. Nonetheless, these findings ratify the assumption that improvement and gains are evident among students who receive instruction in critical thinking.

Another model that focuses on the instruction on critical thinking is called the "Probe Method I" (Shepherd, 1998). This method promotes problem solving, cooperative learning, and the integration of technology into the classroom. Such elements in the class encourage learners to be actively involved in performing activities that deal with higher levels of thinking. Activities such as defining problems, discussions, gathering relevant information, and collaborating with peers are common in this model. Another important aspect of this model is the goal of developing students' self-esteem and higher levels of responsibility. In one study, Shepherd (1998) sought to examine the effectiveness of the Probe Method I on the development of critical thinking skills in fourth and fifth grade elementary students. The problem presented to students in the experimental group was the housing shortage in six different countries. In order to solve the problem, students engaged in web-based research and collaboration with peers. The results showed significant gains for the group that used the Probe Method I.

Other researchers have also tried to develop programs to develop critical thinking skills. In one study, Hendrix (1995) designed a treatment to develop critical thinking skills in college students.

The experimental group that received the treatment was compared to a group that received the standard reading program. The results of this study show that the experimental group significantly improved their critical thinking skills and reading comprehension despite not having done that well in reading vocabulary.

Some researchers have identified the potential of other environments which are different from the classroom to develop critical thinking skills. Sloffer, Duebber and Duffy (1999) studied the results of implementing an asynchronous conferencing tool (ACT) with two groups of students, one graduate class whose task was a debate and an undergraduate class in psychology whose task was a peer critique. The instructors of both groups reported that students showed better critical thinking skills through their interaction in the discussions. Researchers pointed out the importance of the design of the task, the features of the system and students' motivation. The role of the instructor was also essential in facilitating the activities and promoting active reflection.

Other researchers have explored the benefits of the explicit instruction of critical thinking skills in the classroom. One study (Patching, Kameenui, Carnine, Gersten, & Colvin, 1983) compared three groups of fifth graders and the effect of the type of instruction on three critical reading skills: faulty generalizations, false causality and invalid testimonials. One group received direct instruction, another used a workbook with corrective feedback, and the other received no treatment. Results of the three tests given to the three groups after a three-day period indicated that students that received direct instruction showed significant differences in performance compared to the other two groups. These results confirm the need to approach instruction on critical thinking skills directly.

More recently, one study (Hofreiter, Monroe, & Stein, 2007) explored the effect of explicit instruction in an undergraduate forestry course aimed at developing responsible environmental citizenship. The students were involved in discussion and written assignments dealing explicitly with specific critical thinking skills. The skills included in the study are based on the Delphi study (Facione, 1990) and include skills such as interpretation, analysis, evaluation, inference, explanation and self-regulation. The results after the 15-week class showed that students significantly improved as reflected through their performance in an essay, a Likert assessment and qualitative interviews. The researchers point out the value of teaching explicitly critical thinking skills in the classroom. They also stress the importance of the careful modelling and evaluation of the skills and the introduction of real-world problems and contexts.

The studies presented here reflect an approach to critical thinking skills instruction that calls for active work in preparing students, as well as the need to provide varied and meaningful opportunities to interact with these skills in the classroom. These studies also point out that the best way to structure the learning experience to introduce critical thinking is to include these skills in the work with different subjects in the curriculum. Another aspect worth considering is the importance of integrating activities such as reading and discussions in an attempt to create research habits and spaces to share insights on a variety of topics. The current study aims at integrating the salient findings of these studies in a project that seeks to expose students to rich opportunities to exploit their contact with the information in a structured and meaningful way.

This study will show whether students who participate in instruction emphasizing the activation of higher levels of thinking through the expansion of reading exercises improve in these skills, compared to students who participate in traditional instruction. I intend to compare the results of both types of instruction on the development of critical thinking skills.

## 3  Method

### 3.1  Participants

Eighty-three students participated in this study. Forty-three students were in the experimental group and 40 were in the control group in the final sample. The sample was formed by 100% Colombian students and there were 40 female students and 46 male students.

All the participants were college students taking their first level of English as part of their undergraduate programs. Their ages ranged from 18 to 23 years old. Their economic status was middle class. They study in a private university in the capital city of Colombia, Bogotá, which hosts students from all over the country. Students in the English classes come from various programs (e.g. design, engineering, architecture, history, communication, etc.). Each semester lasts 15 weeks. Each class is two hours long, with a total of 2 classes per week. Along with reading, students are exposed to other language skills such as listening, writing and speaking as part of learning English in this program. A total of 8 classes in level 1 were included. Class size ranged from 12–15 students.

Students in both groups took the test prior to starting active work with any of the four above-mentioned language skills in the class. The original pre-test sample of students included a total of 43 in the experimental group and 49 in the control group. The attrition rate over the 6 month period was 0% for the experimental group and 18% for the control group. Students in the control group dropped out from the study because of schedule changes or replacement exams. The students were tested twice during the study: at the beginning of the semester (August, 2008) and at the end of the semester (November, 2008). The pre-test and post-test took 50 minutes to administer and required only one session each time. Students had 45 minutes to complete the test.

### 3.2  Instrument

The instrument used in the study to measure the critical thinking skills of the students was the California Critical thinking test (CCTST; Facione, 1995). This test is a standardized, norm-referenced test that assesses critical thinking skills in authentic problem solving situations (Facione, 1998). The skills this test examines are based on an interdisciplinary definition of critical thinking by the Delphi research project (Facione, 1990). These skills are analysis, evaluation, inference, inductive, and deductive reasoning. Appendix 1 presents the definitions of these skills for this test. The reliability of the test was established with a Kuder Richardson value of 0.68 to 0.75 (Facione et al., 1998). A group of evaluators (Cook et al., 1996) of critical thinking assessment tests available in the market ranked the CCTST as having moderately high validity and feasibility. The completed instruments for the pre and post-test were scored by Insight Assessment which reported separate scores for each one of the skills or sub-scales: analysis, evaluation, inference, inductive and deductive reasoning, and a total score of overall critical thinking ability.

Two forms of the test are available. Form A in paper and pencil format was used. It contained 34 multiple choice items of varying levels of difficulty. Questions ranged from basic analysis of the meaning of sentences to more complex integration of critical thinking skills (Facione, 1990). The form used was an official translation in Spanish of the original test designed by Dr. Peter A. Facione (1995). The reason for using this version of the test was to prevent limitations in students' proficiency in English compromising their results in the test.

### 3.3  Procedures

Prior to this study, letters were sent to the coordinator of the foreign languages department of the university where it was conducted, and to the coordinator of the English program as well. Once approval letters were received, the researcher proceeded to select the classes for both groups and sent out informed consent forms. The only criterion for the selection of the groups in the study was to be in an English level 1 class. An experimental design with random assignment of students to the experimental and control groups within this level was used. The number of students in each class was balanced at the beginning of the study (approximately 14 students).

There were informative meetings with each class in each group to let them know about the study and to receive signed informed consent forms. If students were under 18 years old, then informed consent forms were sent to their parents for approval. When signed forms were obtained from all students, both groups were administered the CCTST as the pre-test measure. The main

researcher administered all tests on separate dates following careful administration procedures. The scoring of the test was undertaken by the institution that commercialized this test, thus guaranteeing the reliability of the results.

The main difference between the students in the control and the experimental groups was that the students in the latter group were given extra activities to complement their work with the reading exercises, as suggested by the English textbook, to activate higher order thinking levels. There were four teachers in the control group and two teachers in the experimental group.

The dependent variable is the development of critical thinking skills. The independent variables are the types of instruction used in the English class. In the present setting, the institution has been giving instruction that expands the reading activities by incorporating tasks that activate higher levels of thinking (i.e. experimental groups). In the control group, teachers took the approach of limiting instruction to the completion of exercises using information at a very basic level.

Teachers in the control group adhered completely to the book's reading activities with no expansion activities. These activities included gap-fill exercises, matching exercises, and questions based on the information explicitly presented in the reading texts. In general terms, these exercises required students to recall or retell information, but not to analyze it.

The treatment or intervention carried out by the two teachers in the experimental group was the expansion of reading activities for each lesson of the English textbook used in the class. Each reading exercise had three to five activities that expanded the work initiated in the textbook. These activities were designed to activate various levels of critical thinking. Students were exposed initially to basic questions to encourage comprehension of the information and gradually moved to more complex activities that demanded analysis, application, evaluation and synthesis of information given in the original text. For example, for a short reading passage about a housing project on a ship, students were first asked to explore the facilities on the ship, and then to determine how people can entertain themselves while on the ship. In this manner, the students were working with reading comprehension. Then, they were asked to write a description of their own homes using the model of the reading. Thus, they worked at the application level. In order to work at the analysis level, students had to explore the implications of having a home at sea and how people's lives could be affected by living on a boat permanently. At the synthesis level, students had to design a draft of a housing project in an unusual environment. Finally, students were asked about the reasons to buy, or not to buy an apartment on a boat, or even to invest in a project like this. Thus, they were exposed to the evaluation level (See Appendix 2 for samples of other expansion activities).

Some modifications to the originally-planned program took place after the fifth week of the semester. The changes related to the experimental groups and the feedback from the teachers. The researcher made these changes, which were implemented due to the difficulty teachers were sensing among students due to limitations in the vocabulary of the activities and the lack of previous exposure or clarity of some of the thinking processes involved. One modification was the use of small group discussions as a way to encourage interaction and discussion. This was essential to help students gain confidence in the activities as well as to use English to express their ideas. Another important modification was the design of worksheets (See Appendix 3 for samples of worksheets) to explore the activities of analysis in greater detail. The changes provided choices for students to select and explain. These worksheets also contributed to expanding students' vocabulary in the various topics.

The main researcher administered all tests on separate dates following careful administration procedures. The scoring of the test was completed by Insight Assessment, the institution that commercializes this test. The fact that this is a test which can only be scored by this institution increases the reliability of the results. The correct answers for the questions are not available to individuals outside the company.

## 4   Results

### 4.1   Pre-test data

The results in the pretest for both the experimental and the control groups show that there were no significant differences between them. The effect of the treatment was tested using Levene's test for homogeneity or equality of variance in different samples. The t-test was used in order to analyze the results of the students in CCTST and this procedure typically assumes homogeneity of variance. In this study the value of p-value was not significant ($> 0.05$) therefore the equality of the samples can be assumed. Table 1 shows the total results of overall critical thinking ability, as well as in the categories or sub-scales (i.e. analysis, evaluation, inference, deductive and inductive reasoning). Table 2 shows the results of the t-test for both groups in the pre-test.

**T-test pre-test**

| Group Statistics | | | | | |
|---|---|---|---|---|---|
| | Group | N | Mean | Std. Deviation | Std. Error Mean |
| Total | Experimental | 43 | 10.42 | 3.554 | .542 |
| | Control | 40 | 10.28 | 2.918 | .461 |
| Analysis | Experimental | 43 | 2.88 | 1.577 | .240 |
| | Control | 40 | 2.50 | 1.281 | .203 |
| Evaluation | Experimental | 43 | 3.28 | 1.968 | .300 |
| | Control | 40 | 3.85 | 1.528 | .242 |
| Inference | Experimental | 43 | 4.26 | 2.060 | .314 |
| | Control | 40 | 3.92 | 1.789 | .283 |
| Deduction | Experimental | 43 | 5.56 | 2.164 | .330 |
| | Control | 40 | 5.18 | 2.171 | .343 |
| Induction | Experimental | 43 | 3.67 | 1.924 | .293 |
| | Control | 40 | 4.05 | 2.025 | .320 |

**Table 1: Descriptive statistical results for the pre-test experimental and control groups**

The results summarized in Table 2 indicate that the two groups do not differ from each other in the level of expertise with the critical thinking skills as reflected by the total score. In addition, we can say that in the sub-scales there is no significant statistical difference either. This homogeneity allowed us to assume that at the beginning of the process, both groups started from a similar place.

| Independent Samples Test | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | |
| | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| Total | Equal variances assumed | 1.182 | .280 | .200 | 81 | .842 | .144 | .717 | -1.283 | 1.570 |
| | Equal variances not assumed | | | .202 | 79.797 | .841 | .144 | .712 | -1.273 | 1.560 |
| Analysis | Equal variances assumed | 1.196 | .277 | 1.211 | 81 | .229 | .384 | .317 | -.247 | 1.014 |
| | Equal variances not assumed | | | 1.221 | 79.593 | .226 | .384 | .314 | -.242 | 1.009 |
| Evaluation | Equal variances assumed | 3.698 | .058 | -1.468 | 81 | .146 | -.571 | .389 | -1.345 | .203 |
| | Equal variances not assumed | | | -1.482 | 78.556 | .142 | -.571 | .385 | -1.338 | .196 |
| Inference | Equal variances assumed | 3.649 | .060 | .779 | 81 | .438 | .331 | .425 | -.514 | 1.176 |
| | Equal variances not assumed | | | .783 | 80.632 | .436 | .331 | .423 | -.510 | 1.172 |
| Deduction | Equal variances assumed | .062 | .804 | .805 | 81 | .423 | .383 | .476 | -.564 | 1.330 |
| | Equal variances not assumed | | | .805 | 80.528 | .423 | .383 | .476 | -.564 | 1.331 |
| Induction | Equal variances assumed | .054 | .818 | -.867 | 81 | .389 | -.376 | .433 | -1.238 | .487 |
| | Equal variances not assumed | | | -.865 | 79.768 | .390 | -.376 | .434 | -1.240 | .489 |

**Table 2: Results for the t-test comparing the pre-test for the experimental and control groups**

## 4.2  *Differences in achievement at the end of the semester*

An independent samples T- test was also used to analyze performance differences within the experimental group and the control group at the end of the first semester. In relation to the results between the experimental and control groups regarding improvement in the test after one semester, there were no significant differences. The *p* values in the total scores and each of the areas were > .05 as shown in Tables 3 and 4. Therefore, it can be assumed that there was no significant change in any of the groups by the end of the semester.

**T-test post-test**

| Group Statistics | | | | | |
|---|---|---|---|---|---|
| | **Group** | **N** | **Mean** | **Std. Deviation** | **Std. Error Mean** |
| **Total 2** | Experimental | 43 | 10.12 | 3.260 | .497 |
| | Control | 40 | 9.88 | 3.073 | .486 |
| **Analysis 2** | Experimental | 43 | 2.67 | 1.507 | .230 |
| | Control | 40 | 2.35 | 1.272 | .201 |
| **Evaluation 2** | Experimental | 43 | 3.74 | 1.706 | .260 |
| | Control | 40 | 3.78 | 1.510 | .239 |
| **Inference 2** | Experimental | 43 | 3.70 | 1.871 | .285 |
| | Control | 40 | 3.75 | 1.481 | .234 |
| **Deduction 2** | Experimental | 43 | 4.98 | 1.994 | .304 |
| | Control | 40 | 4.70 | 1.814 | .287 |
| **Induction 2** | Experimental | 43 | 4.05 | 1.838 | .280 |
| | Control | 40 | 4.20 | 1.713 | .271 |

**Table 3: Descriptive statistical results of the inter-groups post-tests.**

As can be seen in Table 4, there was no improvement in the results of any of the two groups tested in this study. Nevertheless, both groups' means were really close not only in the total score of the test but also in the sub-scales.

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Independent Samples Test** | | | | | | | | | | |
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | | | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| **Total 2** | Equal variances assumed | .012 | .912 | .346 | 81 | .730 | .241 | .697 | -1.145 | 1.628 |
| | Equal variances not assumed | | | .347 | 80.984 | .729 | .241 | .695 | -1.142 | 1.625 |
| **Analysis 2** | Equal variances assumed | 1.342 | .250 | 1.056 | 81 | .294 | .324 | .307 | -.287 | .936 |
| | Equal variances not assumed | | | 1.062 | 80.262 | .291 | .324 | .305 | -.283 | .932 |
| **Evaluation 2** | Equal variances assumed | 1.806 | .183 | -.087 | 81 | .931 | -.031 | .355 | -.737 | .675 |
| | Equal variances not assumed | | | -.087 | 80.812 | .931 | -.031 | .353 | -.733 | .672 |
| **Inference 2** | Equal variances assumed | 1.496 | .225 | -.141 | 81 | .889 | -.052 | .372 | -.793 | .688 |
| | Equal variances not assumed | | | -.142 | 79.015 | .888 | -.052 | .369 | -.787 | .682 |
| **Deduction 2** | Equal variances assumed | .155 | .695 | .660 | 81 | .511 | .277 | .419 | -.558 | 1.111 |
| | Equal variances not assumed | | | .662 | 80.964 | .510 | .277 | .418 | -.555 | 1.109 |
| **Induction 2** | Equal variances assumed | .230 | .633 | -.393 | 81 | .696 | -.153 | .391 | -.931 | .624 |
| | Equal variances not assumed | | | -.394 | 80.999 | .695 | -.153 | .390 | -.929 | .622 |

**Table 4: Results for the t-test comparing the results of the inter-groups post-tests**

## 5   Discussion

This study found that the impact of the intervention on the reading component was not statistically significant. There were no significant gains in the development of critical thinking through the implementation of structured reading lessons as shown by the students' results in the post-test. Students obtained low scores in both attempts at the CCSTS test. According to the interpretation document of the scores for the test, the students' results were approximately 10 points, indicating that they were in the $10^{th}$ percentile of the population. The reported mean total score of 10.20 (SD=3.24) of both groups in the pre-test and post-test was compared with the mean total score of 15.89 (SD=4.457) for the norm sample. This norm sample was a group of 781 college students from an American state university, most of them at the junior level. The mean score of the students in the study indicates that most students are considerably less skilled than the typical junior student in college.

It is possible that the results could show that critical thinking skills such as analysis, inference, inductive and deductive reasoning, and evaluation were not developed enough through previous instruction. Another factor that may also explain the low results could be the test used. Despite being a test designed for college students, which suited the population in the study, it is a norm-

referenced test for U.S. college students. This is a factor that could be directly linked to a mismatch between the two populations in terms of specific cognitive skills. In fact, critical thinking is very sensitive to the context (Norris, 1985), specifically referring to skills such as making inferences which can depend on the background of the subjects and level of sophistication of the tasks. This may also indicate that the resulting inappropriateness of the test is due basically to contextual conditions that influence people's performance and not necessarily suggests a critical thinking deficiency (Norris, 1985). Issues related to measuring critical thinking also arise and their impact needs to be considered. Rane-Szostak & Robertson (1996) identified, among some of these issues: the lack of a clear definition of the concept of critical thinking, a mismatch of the methods used with the program goals and problems with the validity and reliability of the measures, just to mention some of the most important ones. The length of the study may have also influenced the lack of improvement in the test scores. This may suggest that students need to be exposed to the type of activities proposed in this study for a longer period of time for meaningful changes to take place. According to Carroll (1963), "the learner will succeed in learning a given task to the extent that he spends the amount of time that he needs to learn the task" (p. 725). Thus, a longitudinal study of at least three years is more likely to show more congruent and positive results based on a continuous intervention in an entire English as a Foreign Language program.

In order to complement the information provided by the test, an informal survey was designed by the researcher and administered at the end of the semester to gather information on the students´ perception of their development related to each of the skills through the semester (see Appendix 4 for a sample of the survey). The survey included 5 questions related to their perception of improvement in their abilities to comprehend, apply, analyze, synthesize and evaluate information in their reading assignments. Based on this survey, which was given along with the post-test, students in the experimental group acknowledged that their exposure to the activities enhanced their skills to understand and analyze the information in the reading texts more deeply. These students reported that topics in the readings seen in class were exploited more and felt that somehow they connected more with the content instead of just completing mechanic exercises. Some students even stated that some topics were more interesting than they thought because of the questions asked by the teachers.

On the other hand, teachers in the experimental groups pointed out some important issues in their final reflection of the experience. They discussed the positive results they observed as students became familiar with the activities and increased their proficiency in the language. In addition, they acknowledged the importance of continuing the work with critical thinking skills in all levels. Their only concern was related to the skills at the level of analysis which they found difficult for the students due to the limitations in the students´ language proficiency. In fact, this concern was expressed during the development of the first lessons which prompted the researcher to design worksheets for the area of analysis, including several choices for student selection. Teachers also pointed out that even more than the lack of vocabulary to express their ideas about issues raised through the questions, it was students' lack of experience or consciousness about critical thinking processes that affected the results. This unawareness was, in the teachers' opinion, what made it hard for some students to complete the exercises proposed in the intervention at the beginning of the study and for some even by the end of it. Teachers agreed that students can show greater gains in the development of critical thinking skills if these expansion activities were introduced later in the process of language learning. Nevertheless, this would bring up the issue that the development of these skills could be the result of the exposure to other subjects in their university programs and the whole college experience (Terenzini, Springer, Pascarella, & Nora, 1995) and not the treatment in itself.

Considering the characteristics of the English program and the diversity of the students, this study attempted to control the possible variables without dramatically interfering or affecting the conditions of the classes. However, it is feasible that factors such as experience with critical thinking skills in prior schooling or students' real motivation to learn English may play a very important role in the results obtained.

The present study aims at creating a reflection about the role of the EFL teacher in providing opportunities for learners to actively get involved in activities that can help them develop critical thinking skills. The EFL/ESL classroom is a place in which teachers can promote the creation of critical thinkers (Chamot, 1995). However, it is important to analyze the understanding of critical thinking teachers may have and if this understanding is appropriate for the English language classroom as pointed out by Atkinson (1997). There is a growing interest in the EFL classroom for the inclusion of critical thinking skills in the repertoire of skills it aims at developing in students. One way this is happening is through textbooks, some of which have started to include activities geared to fostering these skills. Nevertheless, there is still a lack of consensus about the right moment to introduce these skills, which skills to teach and what they mean among developers of instructional materials and educators (Beyer, 1984). Therefore, teachers need to take a more proactive role in the classroom. They need to research the topic and adapt materials at hand to turn them into eventful thinking encounters for their students.

## 6  Implications

At the beginning of this study, it was evident that critical thinking skills could only be developed through carefully designed activities to complement the existing ones in the reading sections of English textbooks. The researcher started with the concept that teachers should not wait until students have an intermediate level of proficiency to expose them to critical thinking exercises. Instead, exposure should be from the first courses so students could interact with them in a systematic way and by means of interesting and relevant activities operating in higher levels of thinking to expand the work with reading. Unfortunately, the study did not show a major impact on the students' results at the end of the semester. However, this does not necessarily mean that there was no impact on the students' development of such skills. Instead, it could mean that the time may not have been long enough to show meaningful gains.

Further studies are needed. It would be useful to consider the use of another instrument that can allow subjects to demonstrate their improvement and reflect on their own perceptions of their processes. Most instruments in the market may not suit the characteristics of the students in the South American context. However, the use of essay tests such as The Enniss-Weir Critical Thinking Essay could lead to a deeper look at the thinking processes used by the examinee to arrive at solutions (Norris, 1985). Some drawbacks of this type of test for this context may be the kind of problems included, their relevance for the examinees and the requirements in level proficiency. Another option is the design of an instrument that takes into account the contextual characteristics of the South American student and the extensive literature on critical thinking to ensure its validity. A different instrument that might be more advantageous for the South American context would require another research study. Researchers could also focus on determining if the levels of proficiency play a definite role in the acquisition of critical thinking skills and if these skills actually transfer from one language to another. Regarding the latter aspect, Atkinson (1997) affirms that there is little evidence this transference of skills between domains happens and that only the design of new evaluation instruments can contribute to observe these transfer effects. In addition, researchers should determine the role of curricula and syllabi in the consideration of critical thinking skills along with other learning and language skills in the learning of English as a second or foreign language. For example, the impact of the implementation of these skills in the development of the target language could be explored. Due to the limited number of studies dealing with the development of critical thinking skills in L2, new efforts should be made to analyze and record the advances of EFL instruction in the fostering of critical thinking. Overall, this study attempted to raise the issue of creating opportunities through the materials to develop skills that teachers sometimes tend to take for granted.

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## Appendix 1

DEFINITION OF THE CCTST SKILLS (SUB-SCALES)

The subscales are based on the Delphi definition of critical thinking and are presented here as taken from the interpretation document issued by Insight Assessment:

**Analysis:** 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.

**Inference:** To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to deduce the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation.

**Evaluation:** 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.

**The following traditional scores are also provided**

**Deductive Reasoning** as used in the CCTST sub-scale means the assumed truth of the premises purportedly necessitates the truth of conclusion.

**Inductive Reasoning** as used in the CCTST sub-scale means an argument's conclusion is purportedly warranted, but not necessitated, by the assumed truth of its premises. Scientific confirmation and experimental disconfirmation are examples of inductive reasoning.

## Appendix 2

EXPANSION ACTIVITIES SAMPLES

**Reading: The passage describes means of transportation in two cities.**

| LEVEL | ACTIVITY |
|---|---|
| COMPREHENSION | How similar or different are the forms of transport in these two countries compared to the forms of transport in your country? |
| APPLICATION | Describe two different commuting routines of two people you know. |
| ANALYSIS | What do you infer about the physical demands for people who use these two forms of transport? |
| SYNTHESIS | Invent a new form of transport that may make commuting quick and convenient for people. |
| EVALUATION | If given the option of using any of the two forms of transport in appropriate conditions in your country, which one will you use daily? Explain. What solutions/ideas would you suggest to avoid the problems these two forms of transport have according to the author? |

**Reading: The passage describes the life of a prodigy singer.**

| LEVEL | ACTIVITY |
|---|---|
| COMPREHENSION | How different is Charlotte's life from an average kid's life? |
| APPLICATION | Do you know any other prodigy kid? What challenges do they have to face? |
| ANALYSIS | Which of the following could cause stress on Charlotte? What does the author imply about Charlotte's future career based on her story? |
| SYNTHESIS | If you were a prodigy child's manager, what would you recommend him/her to do or not to do in his/her career? |
| EVALUATION | If your kid were a specially gifted artist, would you let him/her get in the show business? What are the positive and negative aspects of being young, rich, and famous? |

**Reading: The passage presents the life of a successful entrepreneur and his reality show.**

| LEVEL | ACTIVITY |
|---|---|
| COMPREHENSION | What events in Jamie's life have turned him into a success? |
| APPLICATION | What are the characteristics of Jamie's mentoring style? Can this approach be applicable to other occupations? |
| ANALYSIS | What do you infer about Jamie's staff's future? What does the author imply about Jamie's plans for the future? |
| SYNTHESIS | If you want to become rich and famous in your profession, what will you need to do? If you could host a reality show like Jamie's but in your profession, how would it be? |
| EVALUATION | What is the value of training your own staff compared to hiring trained and experienced employees? Would you like to be part of a reality show to get a job in a big company? |

## Appendix 3

WORKSHEETS SAMPLES

**Reading: The passage describes means of transportation in two cities.**

<u>**Analysis**</u>

What do you infer about the physical demands for people who use these two forms of transport?
a.   A good physical state to cycle to work.
b.   Very little demand for people taking the train to work.
c.   Not much effort is required because people are used to cycling.
d.   Not much effort because people are sitting all the time in a train.
Other_____

**Reading: The passage describes the life of a prodigy singer.**

<u>**Analysis**</u>

Which of the following could cause stress on Charlotte? Explain.
a.   Record company
b.   Parents
c.   Fans
d.   Friends and boyfriend
e.   Media
Other_____

What does the author imply about Charlotte's future career based on her story? Explain.
a.   It will end soon.
b.   It will continue being brilliant.
c.   It will be interrupted by common adolescent issues.
d.   It will reach extraordinary levels of popularity.
Other_____

**Reading: The passage presents the life of a successful entrepreneur and his reality show.**

<u>**Analysis**</u>

What do you infer about Jamie's staff's future? Explain.
a.   They will continue working in Jamie's restaurant for a long time.
b.   They will get independent.
c.   They will look for better opportunities somewhere else.
d.   They will continue training.
Other_____
What does the author imply about Jamie's plans for the future? Explain.
a.  He will have a second season of his reality show.
b.  He will open a school for chefs.
c.  He will travel around his country teaching people how to cook.
d.  He will open new restaurants in other cities.
Other_____

**Appendix 4**

SURVEY

Mark the choice that best describes how much you have improved your performance in the following skills based on the work done in the area of reading in your English class.

1. Expressing in my own words the ideas given in the reading passages

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

2.  Finding similarities and differences in the information presented

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

3. Transferring information from one context to another.

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

4. Making inferences and implications. For example, infer information, points of view, and reasons for something to happen and make informed predictions.

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

5.  Analyzing the different elements of the information and find relationships.

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

6.  Creating new relationships with the information.

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

7. Evaluating different points of view.

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

8. Make informed conclusions.

A lot ____ some _____ A little _____ Almost nothing _____ Never been exposed to this __

In general terms, how do you perceive your ability to interpret the information and make connections not that evident at first sight?
_____
_____
_____