The Effect of Jigsaw Technique on Students' Reading Comprehension in Eleventh Grade of the I.E.M Ciudadela in Pasto

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THE EFFECTS OF JIGSAW ON READING COMPREHENSION

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Abstract

This study aims to determine the effects of Jigsaw as part of the cooperative language learning approach on students' reading comprehension skill, in a public high school in Pasto. Two groups of 11th-grade were selected; the jigsaw group (experimental group, n=20 students) and the non-jigsaw group (control group, n= 25 students). In this pre-experimental research "pre-test/post-test" data was collected through data matrices. The statistical analysis revealed that there were significant differences between the experimental and control groups in terms of reading comprehension skill after the application of the treatment. In addition, it was determined that the students of the experimental group had positive views on the use of the jigsaw technique.

Resumen

El propósito de este estudio es determinar los efectos de Jigsaw como técnica del enfoque de aprendizaje cooperativo en el desarrollo de la comprensión de lectura de estudiantes de una institución educativa publica en Pasto. Para este estudio pre-experimental, dos grupos de undécimo grado fueron seleccionados; uno de ellos como grupo control (n=25 estudiantes) y el segundo como grupo experimental (n=20 estudiantes). Los estudiantes de ambos grupos presentaron un examen al inicio (pre-prueba) y al final del tratamiento (post-prueba) y los resultados fueron recopilados en matrices de datos. El análisis estadístico reveló que existe una diferencia significativa entre los resultados del grupo experimental y el grupo control en relación al nivel de comprensión de lectura después de la aplicación del tratamiento. Además se determinó que los estudiantes mostraron una buena actitud hacia la técnica de Jigsaw.

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At the present time, the government policies in Colombia have established the implementation of English in the educational curriculum, as a way to cope with the necessities that it implies. English has become an international language, a necessity for interacting with the world as stated by Graddol (1997) "English is widely regarded as having become the global language" (p. 2).

As a starting point it is advisable to make students develop skills such as: Reading or Listening which are classified as receptive skills (Harmer, 2007). These receptive skills would provide the students with the input necessary to take in the language and then move on to the productive skills like Speaking and Writing. For this study, the emphasis is on the reading skill which if properly taught, will build the basis necessary to progress towards communicative competence.

Furthermore, regarding the importance that reading comprehension has on students' own process, one can find a pertinent issue concerning this specific context, the *Pruebas Saber 11* national exam, one of the educational requirements of the Colombian government which evaluates the Colombian education including the English subject in the eleventh grade. This exam focuses on reading comprehension questions for this specific subject.

The results obtained in English have not been as expected. Statistics have shown a low performance in the foreign language during the last five years; "En el calendario A, entre 2007 y 2009, la proporción de estudiantes de colegios urbanos por debajo del nivel A2 fue, en promedio, del 92, 4% entre los establecimientos oficiales" *Examen de estado de la educación media* (Resultados del periodo 2005 – 2010; 2011, p. 37). There can be different reasons that explain the students' low performance in English in this national exam. For instance, the reading

comprehension strategies used by teachers in the classrooms could have affected their achievement. Then, it would be worthwhile implementing techniques that help students to overcome this situation, for example, jigsaw which follows the principles of a current approach such as the Cooperative Language Learning (CLL).

Research Question

Based on the above considerations and as a focus of this study, the research question proposed is:

Is there a significant difference between the scores of pre-test and post-test, which measured comprehension in the skill of reading in the experimental group on which the jigsaw technique was applied and in the control group on which the usual instruction was applied?

Hypothesis

For this study it was proposed a null hypothesis which states that there is not a significant difference in students' reading comprehension level of both experimental and control groups after the application of the Jigsaw technique.

Research Objectives

General objective. To determine the effect of applying jigsaw as a Cooperative Language Learning technique on students' reading comprehension in the eleventh grade at the I.E.M CIUDADELA in Pasto.

Specific objectives. To gather information about the students' reading comprehension level at the beginning and at the end of the treatment.

To analyse the information gathered through descriptive and inferential statistics.

Justification

The importance of this research lies on the teaching process which can provide teachers with new views about the effective teaching practice and the implications of the application of jigsaw technique as part of cooperative language learning. In addition, few studies have been carried out and there is little information about how jigsaw can affect learners' reading comprehension in this context.

On the other hand, this study is interesting for its innovative characteristic as it will explore the development of a receptive skill like reading comprehension through the use of a modified jigsaw technique which progressively increases its level of difficulty.

This study may lead to a different option for the students' preparation to take the national exam *Pruebas Saber 11* whose structure is mainly based on readings. This kind of test is a requirement for the enrolment to any public university in Colombia and the students' achievement may differ according to their reading comprehension level.

Finally, this study can provide further information or can be a reference for future research on the effect of the application of Jigsaw as a Cooperative Language Learning technique in this setting.

Review of the Literature

In order to support this study, the following review of the literature was around the independent and dependent variables: jigsaw technique as part of cooperative language learning and reading comprehension.

Cooperative Language Learning

Cooperative Language Learning is part of a more general approach called Collaborative Leaning in which the aim is to make the most of group work for learning more effectively. Cooperative Learning refers to the instructional use of small groups so that students work together to maximize their own and each other's learning (Johnson & Johnson, 1993). However; cooperative learning involves more than just asking students to work together in groups.

Cooperative learning principles. Many principles have been proposed for cooperative learning. (Jacobs, 2002). Heterogeneous grouping principle means that the groups in which students do cooperative learning tasks are mixed on one or more of a number of variables including genre, social class, personality, age, and language proficiency.

Group autonomy encourages students to look to themselves for resources rather than relying solely on the teacher. When student groups are having difficulties, it is very tempting for teachers to intervene either in a particular group or with the entire class.

Simultaneous interaction in which group activities are not used, the normal interaction pattern is that of sequential interaction, in which one person at a time – usually the teacher – speaks. In contrast, when group activities are used, each student participates.

Equal participation refers to a frequent problem in groups. Usually, one or two group members dominate the group and, for whatever reason, prevent the participation of others.

Cooperative learning offers many ways of promoting more equal participation among group members.

Individual accountability must be present in cooperative work and it takes place when the students in a group are willing to learn from the others and share their own knowledge or ideas with them.

The principle of positive interdependence lies at the heart of (CL). When positive interdependence exists among members of a group, they feel that what helps one member of the group helps the other members and that what hurts one member of the group hurts the other members. It is this "All for one, one for all" feeling that leads group members to want to help one another to see that they share a common goal.

Cooperative learning objectives. According to Olsen and Kagan (1992) cited in "*Approaches and methods in language teaching",* the Cooperative Learning is group learning activity organized so that learning is dependent on the socially structured exchange of information between learners in groups and in which each learner is held accountable for his/ her own learning and is motivated to increase the learning of others.

This type of approach seeks to attain objectives such as to raise the achievement of all the students including those who are gifted or academically handicapped, to help the teacher build positive relationships among students, to give the students the experiences they need for healthy social, psychological, and cognitive development, and to replace the competitive organizational structure of most classrooms and schools with a team-based, high performance organizational structure among others.

In order to obtain such objectives the nature of the group-work activities should involve all the learners in contributing for the effective cooperation which will end in the cooperative learning.

Many cooperative learning strategies make use of the principles of cooperative learning for specific purposes. These strategies can be categorized into the following models: 1. The Structural Approach, 2. Group Investigation, 3. Student Team Investigation, 4. Curriculum Packages, 5. Learning Together, and 6. Jigsaw. It is seen that the jigsaw techniques, which have quite flexible practices with limitless variations, are among the techniques, which have been mostly studied and more frequently used compared with the other cooperative learning techniques until today (Doymus, 2007; Hedeen, 2003).

Jigsaw Technique

The jigsaw classroom, originally developed by Elliot Aronson in 1971, was considered effective in increasing positive educational outcomes. As a cooperative learning technique, it has been greatly studied abroad and has been explored in various ways by a number of researchers and teachers in classes of different levels and of different subjects (Chan Kam-Wing, 2004). Today, there are six types of Jigsaw strategies available for teachers to use in their classrooms.

In the original Jigsaw, each member of a group was assigned a different part of the material. Then all the students from different groups who had the same learning material gathered together and formed an “expert group” to discuss and communicate with one another until they all mastered the material. Later, the students returned to their home group to teach the material to other members of their group (Janson, Somsok & Coll, 2008).

The Jigsaw II method was modified from the original method developed by Slavin in 1986. The implementation of Jigsaw II comprises five steps: reading, expert group discussion, home group reporting, testing, and group recognition or group reward. In the design of Jigsaw II, Slavin constructed in it four elements which contributed to its success: mixed ability grouping, individual accountability, group reward and equal opportunity to success (Chan Kam-Wing, 2004).

Jigsaw III developed by Stahal in 1994 incorporates a whole group review process prior to the exam or test that was not present in the 1995 study. This means that after the students join the expert groups and discuss their material; they answer some questions given by the teacher in order to demonstrate comprehension. The same process follows the group discussion in their home groups before the final steps of jigsaw.

In order to stimulate the students' interest in the lesson, the teacher first introduces the session of class by means of lectures, presentation of literature, questioning, proposing problems, or perhaps showing a movie. Students are then sent to a heterogeneous group – the home group – and all students are assigned topics to read. Here each student discusses the expert sheet that is based on a list of topics. Again, the students with the same expert sheet move to their expert group to discuss their topic. In order to check accuracy and understanding of the topic in the expert group, they are assessed by means of a quiz – this being based on the expert sheet. They return to their home group, teach all their group members and take quizzes all based on the original material. Finally, Jigsaw IV, developed by Holliday (2002), includes three important new features: an introduction, quizzes, and re-teaching after individual assessment (Holliday, n.d)

The Jigsaw technique has been reported to improve different variables for a variety of studies. For example, Lewis (2012) used Jigsaw Learning to address students' achievement and knowledge retention. Specifically, this study reported the results of an experimental research designed to determine if jigsaw learning is more effective than lecture-based learning in improving attitudes of university students. The students participating in this study were undertaking a Graduate program focusing on Managing Administration and Education (MAE), in the Faculty of Education at An Giang University in Vietnam, where learning is generally perceived to be passive (Hopcroft, & Silvera, 2006) and the dominant pedagogical method is individual lecture (Harman & Nguyen, 2010). Likewise, Abdullah (2008) describes how Jigsaw II technique has positive effects on students' academic achievement and attitudes to written expression course classes. Students in this research were asked to take classes where they measured the attitudes towards reading through scales composed of 25 items and options of answers such as agree, disagree, and so on. The validity of the scale was measured by one of the factor analysis techniques, Kaiser Meyer-Olkin (KMO) (Abdullah, 2008). Finally, Dyah Wulandary (2009) describes how Jigsaw could positively affect the development of the speaking skill in Indonesian schools where different racial conflicts may take place and where students seem not to be motivated towards speaking.

In like manner research on jigsaw technique in different subjects such as science, chemistry, social studies among others has been carried out. For instance, in introductory chemistry laboratory courses, Smith, Hinckley and Volk (1991) used the Jigsaw method to address a lack of student preparation, and poor understanding of chemistry concepts for acid/base chemistry. It seemed the jigsaw method had a positive effect on the laboratory class, and in

particular for students of low level who showed the greatest gains in post-tests of conceptual understanding.

Although the use of the Jigsaw technique has been reported for a variety of fields and topics, little is known about how it might affect reading comprehension in this specific setting. Research within our group indicated that students from the last grade of this public institution (IEM Ciudadela) did not have a high level in the reading comprehension skill. It is now considered the literature about reading before describing the nature of the study and the intervention based on the Jigsaw technique.

Reading Skill

Reading is a receptive skill which allows students to learn any subject from written texts and which can give great advantages to the learners when practiced and applied through different strategies.

Extensive and intensive reading. To get the maximum benefit of their reading, students need to be involved in both extensive and intensive reading. Harmer (2007)

Extensive reading refers to the reading without exhaustive comprehension of every single word. Instead, students scan and skim for the main information of a text. In this way, they ensure they will enjoy the reading without getting stressed for the vocabulary they do not know.

On the other hand, intensive reading has different strategies which the teacher may control in order to accommodate the desire to have students develop particular reading skills such as the ability to understand the general message without focussing on details and the students' urge to learn the meaning of every single word. Students are far more likely to be

engaged in a text if they bring their own feelings and knowledge to the task, rather than only responding to someone else's ideas of what they should find out. In other words, learners take much advantage from reading when they get involved.

One striking way of reading is to have students read different texts and then share the information they have gathered in order to piece together the whole story. This is called Jigsaw Reading. Harmer (2007)

Jigsaw reading. It is an approach to reading that involves the students in speaking and summarizing skills. It is very useful when working with short authentic texts such as newspaper articles. Jigsaw reading can be done in two ways: two separate stories and one story split into two.

Two news stories that share a theme - for example two separate stories on crime – work with comprehension questions for each story. One half of the class (Group A) will read one story and the other half (Group B) will read another one. The students read their article, answer the questions and check understanding. Students then make pairs with someone from the other group and tell each other about their stories. To help students remember their story teachers may get them to take notes. Alternatively, the students could keep the article with them.

On the other hand, some stories can be clearly divided in two. This model follows the same procedure as above, but giving each group only one half of the story. When the students are recounting their half of the article, the student with the opening half goes first. Once the students have orally exchanged stories, they should then read the other person's article. As a refinement, student B quizzes student A about their article.

Some advantages of jigsaw reading over conventional reading are that each person in the group has responsibility; shyer and weaker students have as much responsibility as stronger students then nobody gets excluded. Besides, large texts, which might be off-putting at first glance, can be broken down into more easily manageable chunks.

To prepare a text for jigsaw reading teachers will only need to cut the text into small, discrete, units allowing for one piece per student or per group if the activity is done in groups. As to the text itself, it should be of the right subject and level for the class. It is advisable to prepare a set of questions to test comprehension. These questions should be varied and cover all areas of the text which will allow different students to answer. (Gareth, 2008)

Jigsaw reading as well as other reading strategies aims to the same purpose which is comprehension. If readers can read the words but do not understand what they are reading, they are not really reading.

Reading comprehension skills increase the pleasure and effectiveness of reading. Strong reading comprehension skills help in all the other subjects and in their personal and professional lives.

Reading Comprehension Theories

There are many theories about reading comprehension, but we refer to the following ones which seem to be more relevant: traditional view, cognitive view and metacognitive view.

The traditional view. According to Dole, Duffy, Roehler, and Pearson, (1991), in the traditional view of reading, novice readers acquire a set of hierarchically ordered sub-skills that sequentially build toward comprehension ability. Having mastered these skills, readers are regarded as experts who comprehend what they read. Some of the most important characteristics of this view are:

1. Readers are passive recipients of information in the text. Meaning resides in the text and the reader has to reproduce meaning.
2. According to Nunan (1991), reading in this view is basically a matter of decoding a series of written symbols into their aural equivalents in the quest for making sense of the text. He referred to this process as the 'bottom-up' view of reading.
3. McCarthy (1999) has called this view 'outside-in' processing; referring to the idea that meaning exists in the printed page and is interpreted by the reader then taken in their own ideas. This model of reading has almost always been under attack as being insufficient and defective, the main reason being that it relies on the formal features of the language, mainly words and structure.

The cognitive view. The 'top-down' model is in direct opposition to the 'bottom-up' model. According to Nunan (1991) and Dubin and Bycina (1991), the psycholinguistic model of reading and the top-down model are in exact concordance. Goodman (1967) presented reading as a psycholinguistic guessing game, a process in which readers sample the text, make hypotheses, confirm or reject them, make new hypotheses, and so forth. Here, the reader rather than the text is at the heart of the reading process.

The schema theory of reading also fits within the cognitively based view of reading. Rumelhart (1977) has described schemata as "building blocks of cognition" which are used in the process of interpreting sensory data, in retrieving information from memory, in organizing goals and sub goals, in allocating resources, and in guiding the flow of the processing system. Rumelhart (1977) has also stated that if our schemata are incomplete and do not provide an understanding of the incoming data from the text we will have problems processing and understanding the text. This model of reading seems to explain the process of a fluent reader, and

has been supported by many authors. See Benavides (1997), for an insightful description of this process.

The metacognitive view. Metacognition involves thinking about what students are doing while reading. Klein et al (1991) stated that strategic readers do the mental activities while reading which go from identifying the purpose of the reading before reading, identifying the form or type of the text, thinking about the general character and features of the form or type of the text. For instance, they try to locate a topic sentence and follow supporting details towards a conclusion, projecting the author's purpose for writing the text (while reading it), and choosing, scanning, or reading in detail, making continuous predictions about what will occur next, based on information obtained earlier, prior knowledge, and conclusions obtained within the previous stages.

Research Design

Design

This study is associated with the quantitative paradigm because it intends to measure the effects of the application of jigsaw as a Cooperative Language Learning technique on students' reading comprehension level. The strengths of the quantitative model are that its procedures produce quantifiable, reliable data which is usually generalized to some population. The quantitative paradigm measures and compares the data obtained in a study; statistics, tables and graphs are often used to present the results obtained. The quantitative paradigm is chosen because it is the most suitable in terms of exactness and also it leads to the objective interpretation of findings.

Type of Study

This study follows the pre-experimental research model because jigsaw as a Cooperative Language Learning technique aims to the development of reading comprehension in students who belong to intact groups of a public high school. Then, the outcomes obtained will be compared and analysed. In this study, the design is control group pre-test post-test.

Description of the Context

This study will be carried out in a public high school in Pasto with limited resources for the teaching of a foreign language; located in the south-eastern part of the city. The surroundings of this institution are classified in the first and second social stratum which means that the majority of students attending this institution belong to the lower and medium class. The population selected for this study varies in genre, race, social beliefs and levels of proficiency in English.

Population

The population chosen for this study is 25 students of eleventh grade for the control group and 20 students of eleventh grade for the experimental group in the I.E.M.CIUDADELA located in the south-eastern part of San Juan de Pasto. The students are almost the same age about 16 and 17 years old and they belong to the same social stratum. All these students have some previous basic knowledge of English vocabulary and grammar.

Materials

The materials for this research are mainly readings divided into pieces. Twelve readings are used for twelve sessions of class of the treatment. They were taken from internet; they were varied in terms of topics, length and type. In addition, there are twelve short comprehension tests of five questions for each reading to be conducted at the end of the sessions.

Instruments for Data Collection

In order to diagnose the students' current level of reading comprehension in English, a reading comprehension test similar to the *Pruebas Saber 11* exam is conducted in the experimental group and in the control group at the beginning of the study. Then, after applying the jigsaw technique during 12 sessions of class, the same test is conducted in both groups in order to discover the difference in their achievement and determine the effect of the technique on the development of the reading comprehension skill. Besides, a survey is to be carried out in order to know whether the students liked or not the procedures used in every English class in the experimental group.

Procedure

In this research, jigsaw as a Cooperative Language Learning technique is implemented by using many different readings over twelve weeks of class. When applying this, it is important to follow the steps suggested by the CLL principles which are a pre-task, a main task and a concluding task in each session.

The first thing to do is to conduct a test in both groups in order to diagnose the current level of students' reading comprehension, and then the treatment will be applied to the experimental group which will be carried out using twelve different varied readings. The other group will attend regular classes. Next, the different readings will be taught in the experimental group, one each class, following the model of the jigsaw technique adapted to this study (see Appendix A for complete proof). Finally, the same test, applied at the beginning is conducted in both groups in order to determine the progress made after the twelve weeks and determine the effect of the technique by comparing the results obtained.

Variables

Independent Variable: Jigsaw technique as part of Cooperative Language Learning.

Dependent Variable: Students' reading comprehension.

The Researcher's Role

For this study two teachers play the role of researchers. One of them would be in charge of carrying out the lesson plan in each session, guide the students throughout the treatment and monitor the students work in the class. The second researcher would undertake the role of observer who neither participates in nor influences the treatment. Instead the researcher would

take notes of students' attendance, arrangement, participation, behaviour, and attitudes towards the materials, technique and any aspect that could have affected the normal process of the lesson plan.

Pilot Study

A pilot study was carried out during three sessions of class of one hour each, following a tentative lesson plan. The steps followed for the development of each class are described below.

Pre-reading. The teacher wrote the title of the story on the board and the students were required to guess the topic of the reading. If they did not dare to say anything, the teacher would ask them some simple questions. It is important to mention that the students were allowed to speak in Spanish. The pre-reading step took about 3 to 4 minutes.

Reading. After the students gave some ideas and mentioned related topics of the reading, the teacher gave to them the reading divided into pieces. The readings were divided into three, four and five pieces each lesson which meant an increasing level of difficulty from one lesson to another. In this second step, the students had to read each piece and try to organize the reading individually. It lasted about 15 minutes to complete this step.

Group discussion. The students read the story individually and later, they made groups of four people to share one another the order they gave to the story. The teacher wrote some questions on the board and the students tried to answer them in group. It is important to mention that those questions were intentionally asked for the students to focus on certain parts of the reading and also that they were allowed to answer them in Spanish, as it facilitated the sharing of ideas without interfering with their comprehension. This step lasted about 15 minutes.

Test. As a final step the students took the reading test individually which contained five questions. Those questions resembled the *Pruebas Saber 11* patterns of questions. This step lasted about 12 minutes.

The three sessions were carried out following the same procedure described above.

Pilot Study Considerations

During the lessons, the teachers realized the students' lack of vocabulary, even though they were in the last grade of this public high school in Pasto. However, they were not allowed to use any dictionaries because the purpose of this study was not focused on the vocabulary but on the reading comprehension skill in general.

The group work was difficult for them since they were not used to working with groups set by the teacher. Those work groups were set based on the easiness of the arrangement in the classroom which was less time-consuming. The students were once given the chance to form their own groups, according to their preferences; nonetheless, they did not work the same way as if they were set by the teacher because there were more opportunities for them to misbehave and not to concentrate on the reading.

After the application of the pilot study, some variations were considered in terms of activities, students, materials and classroom setting in order to apply the technique for the experimental group in the actual study.

Activities. The time for the development of the technique was first set up for 45 minutes which would increase according to the number of pieces the readings were to be divided into. Based on the students' reading speed, group work and the tests, an average time was set for the

application of the technique in each session for the experimental group. For example, for the second step (individual reading), the students who first finished the individual reading were asked to raise their hand in order to keep record of the time each student took. However, this caused pressure among the students who did not finish as fast as their partners.

Consequently, for the experimental group, it was decided not to ask the students to raise their hands each time they finished the reading, but to give an average time for everybody to finish it, instead. In addition, the teacher would check each student's progress and the organization they gave to the reading in the set time.

In the third step (group discussion) the teacher provided the students with some questions to discuss in groups. These questions were written on the board, and some of them may appear in the test. After the application of the pilot study, it was decided not to write any questions on the board before the students have shared their hypothesis about the story and given its order.

Population. The students' response was positive during and after the pilot study. There were some considerations to be taken. The different level related to the reading skill in English, vocabulary knowledge and motivation towards learning were some of the characteristics to highlight during the application of the technique in the pilot study. Some students showed higher levels of proficiency in reading comprehension, deeper concentration and more vocabulary knowledge.

Materials. The reading materials were texts divided into pieces. At the beginning, the pieces were cut and distributed from single packages containing the same paragraph of the reading but it made their distribution difficult among the students and it was more time-

consuming. Consequently, the readings were given to each student in one single package of pieces of paper containing the whole reading.

The readings were selected according to the students' level of proficiency in English. Although, the Colombian government aims to attain B1 English proficiency level for the eleventh grade in public high schools, as it is stated in "Estándares Básicos de Competencias en Lenguas Extranjeras: Inglés", the students' proficiency level was lower and it was necessary to adapt the vocabulary of some readings. Only few words from the readings were replaced with easier synonyms from the first group of readings to the third group of readings and finally the vocabulary remained the same as in the original version of the text for the fourth group of readings of six-piece division.

The readings were varied in topic and length. They were articles taken from internet with topics such as: health, biographies, urban legends and different kind of short stories.

Instruments. For the pre-test and post-test a test similar to the *Pruebas Saber 11* exam was designed. It contained twenty questions which were divided into four categories.

1. Comprehension of texts
2. Incomplete dialogues
3. Interpretation of graphics
4. Organization of sentences

During the application of the pre-test and post-test in the pilot study, the students' response was not positive towards the exam. This feature in the students' response was attributed to the length of the test and the categories which were not directly related to the technique.

After the application of the pilot study it was decided to omit some categories and to change some of the questions in order to best adequate this instrument to measure the ability that the technique was trying to improve which is reading comprehension.

Data Analysis and Findings

Procedures for Data Analysis

This study took into account the quantitative model for the collection and organization of data. Consequently, the pre-test and the post-test measured the students' reading comprehension based on a series of questions. Each correct answer scored (1) and each wrong answer scored (0) in the data matrix, so it could be possible to measure with numbers the students' reading comprehension ability in both groups at the beginning and at the end of the treatment. The tests to diagnose were the same for both groups, experimental and control, at the beginning and at the end of the treatment. The results obtained in the tests were analysed quantitatively through descriptive and inferential statistics. Then, the students' reading comprehension ability was interpreted to determine the presence of differences between both groups at the end of the study. Besides, the *t* test was carried out to discover the p-value of the experiment that must not be higher than 0.05 (critical value assigned to the Human Sciences).

Findings

For this study, two groups were chosen: the experimental group and the control group. Both groups belonged to a public high school, I.E.M Ciudadela in Pasto. The experimental group (grade 11-3) was a class of 20 students and the control group (grade 11-2) was another class of 25 students. Each group had one hour of English class per week.

Table 1

Subjects for the Application of the Study

Groups	Grade	N = number of students
Control	11-2	25
Experimental	11-3	20

In control group (non-Jigsaw group) students were taught through the usual method of English teaching used in this public institution whereas in the experimental group (Jigsaw group) students subjected to the Jigsaw technique already described in the procedure.

In order to explore the differences between the two groups in their reading comprehension level, a test similar to the *Pruebas Saber 11* exam was taken by the students of both groups as a pre-test at the beginning of the treatment (see Appendix B for complete proof).

According to the data related to the pre-test scores, where the control group obtained 34% right answers and the experimental group obtained 37% right answers, it was found that there were no significant differences between the groups in terms of their scores in the pre-test. Moreover, it was inferred that the level of students' reading comprehension was rather basic.

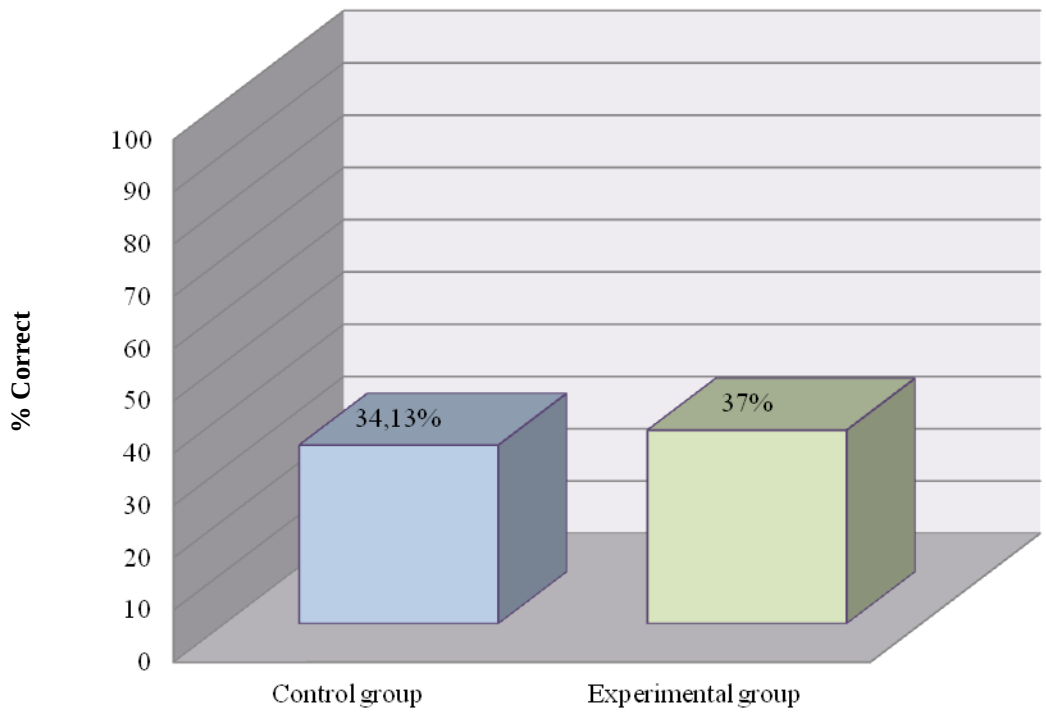

Figure 1. Control and experimental groups' pre-test percentages results

Independent samples *t* test analysis of the data obtained from the pre-test were also carried out in order to determine the differences between experimental (jigsaw group) and control (non-jigsaw group) before the treatment.

Table 2

Pre-test t Test Results

Test	Group	N	Mean	Standard deviation	Variance	p*
Pre-test	Control Non-jigsaw	25	5.08	1.71	2.91	
Pre-test	Experimental Jigsaw	20	5.55	2.09	4.36	0.42

*P**<0.05

In Table 2, it is appreciated that there was not a significant difference between experimental and control groups' means in the pre-test scores (M=5.08; M=5.55). Then, it may be regarded the students' right answers as being similar in both groups which proved their similar reading comprehension level.

Reading tests results. Prior to the application of the technique, twelve varied readings were designed following the procedures of the jigsaw technique adapted for this study. The readings were selected according to the level of the students which was discovered through the previous pilot study carried out in a similar group of students in the same institution (grade 11-1). The readings were selected from different sources such as books, articles, and internet and they were adapted to the students' level by changing the possible difficult words for them (see Appendices C to F for complete proofs). Those readings were applied in the experimental group during twelve weeks.

Each reading was divided into pieces for each student to organize. The first four weeks the readings were divided into three parts. The next four weeks, the readings were divided into four parts, the following two weeks the readings were divided into five parts and the last two weeks the readings were divided into six parts.

This division was made in order to increase progressively the level of difficulty of the jigsaw technique. Besides, the number of words in the readings ranged from 150 to 600 words. However, the readings were not presented in sequence based on their number of words but at random sequence, instead. As the purpose of this study was to determine the effect of jigsaw on reading comprehension, the test of five questions applied at the end of each session as part of the technique, was analysed in order to discover the students' progress during the treatment (see Appendix G for complete proof).

Below the results obtained from each session of class are described to show the achievement of the students on reading comprehension tests.

During the first four weeks, the four following readings were presented to the students: “The Early Bird Catches the Worm (maybe)”, “The Little Mouse and the Lion”, “Coke, Pepsi to Reduce Cancer Chemical” and “Pencil Points”.

The first reading to be presented to the students was a text of 166 words. Its vocabulary was adapted to the students’ level. The time allotted for the application of the technique was 50 minutes.

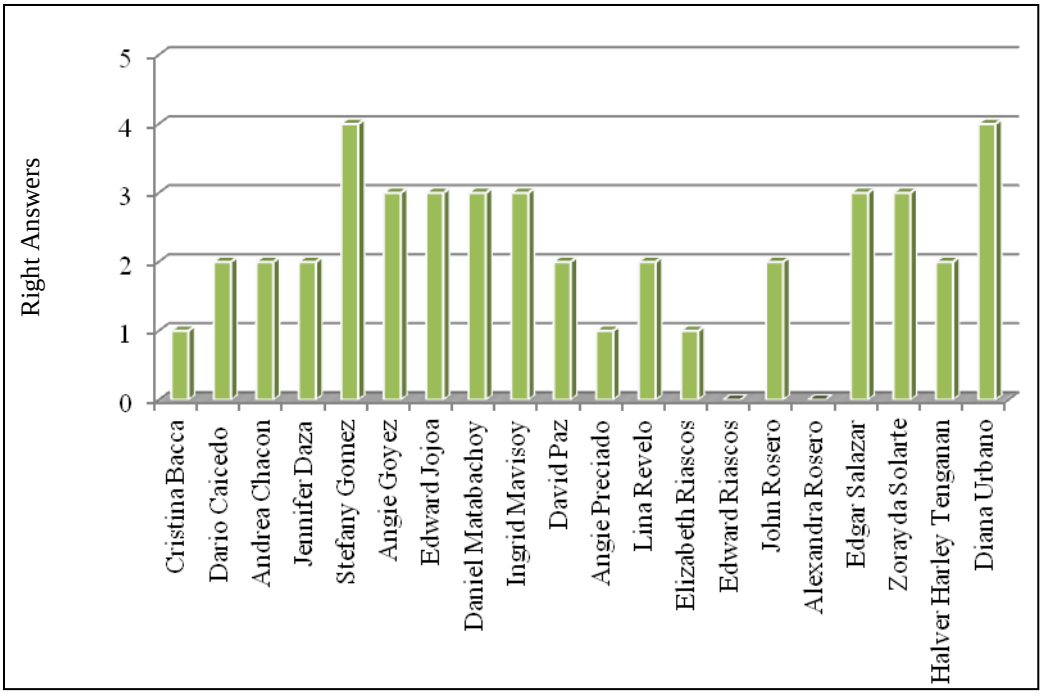

Figure 2. Individual results of reading test 1

The graphic shows the students’ individual performance on the test for the first reading. The columns represent the total right answers that each student obtained in the test.

In figure 2, the students who appeared to have zero right answers represent the absence of those students the specific day.

From the first reading test it is appreciated that the majority of students' right answers ranged from two to three out of five, three students got one answer right and only two students got four answers right. Therefore, the reading comprehension level was perceived as low.

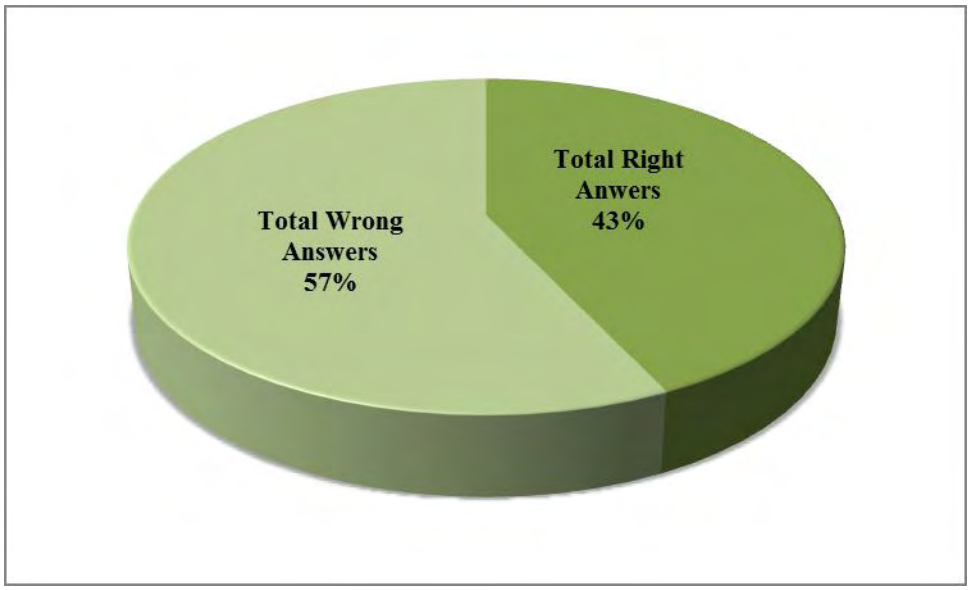

Figure 3. Group percentages results of reading test 1

Their performance as a group reached the 43 % right answers which means that they did not achieve even the half of the total possible right answers (50%).

It was observed the students' positive attitude towards the reading and the technique. However, they still had a difficulty when reading the pieces of paper due to the lack of vocabulary which was evident because they asked for the meaning of many words. Hence, it was inferred that the students had not had enough practice on the reading comprehension skill.

The second reading to be presented to the students was " The Little Mouse and the Lion" which was a text of 172 words. Also, its vocabulary had to be adapted to the students' level. The time allotted for the application of the technique was 50 minutes.

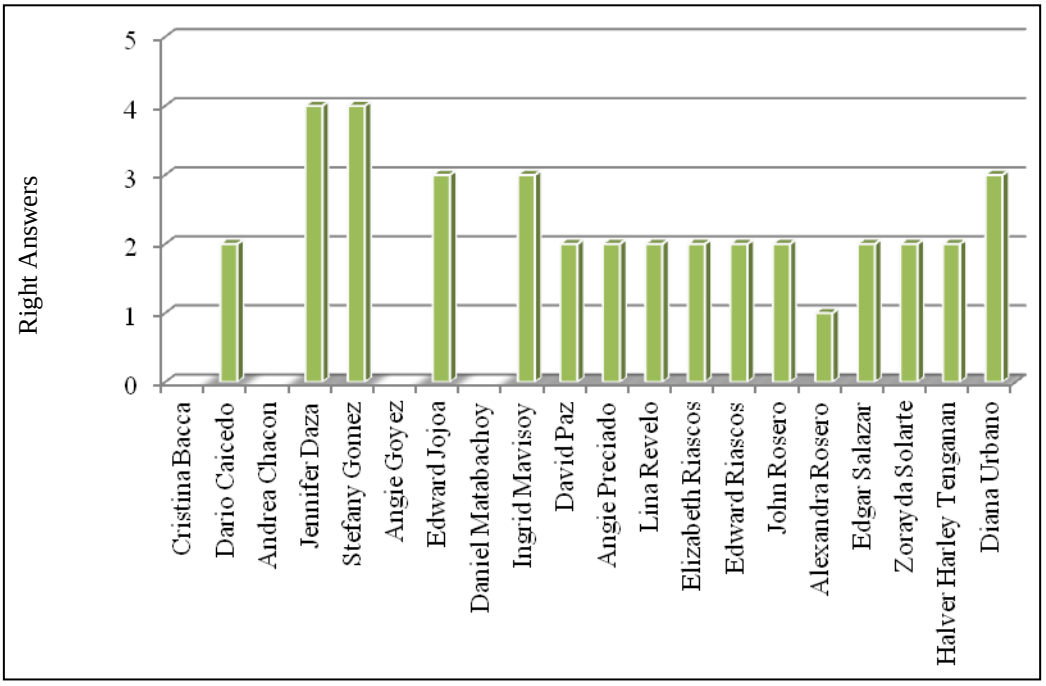

Figure 4. Individual results of reading test 2

From the second reading test results it is appreciated that the majority of students (n=10 students) got two right answers out of five, three students got three answers right, only one student got one answer right and two students got four answers right. Therefore, the reading comprehension level improved very little if these results are compared to the previous ones.

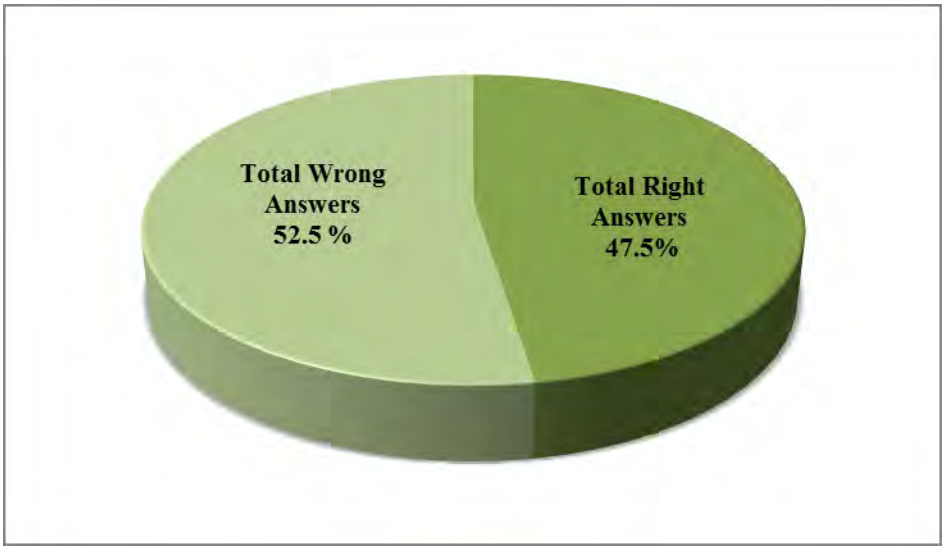

Figure 5. Group percentages results of reading test 2

Their performance as a group reached the 47.5% right answers which means that the students showed a modest improvement in their reading comprehension skill. However, this slight difference may not be relevant as they did not yet achieve the half of the total right answers. Besides, it is a hasty deduction to say that the improvement was the result of the application of the jigsaw technique.

The third reading to be presented to the students was "Coke-Pepsi to Reduce Cancer Chemical". This was a text of 332 words. Its vocabulary was also adapted to the students' level. The time allotted for the application of the technique was 50 minutes.

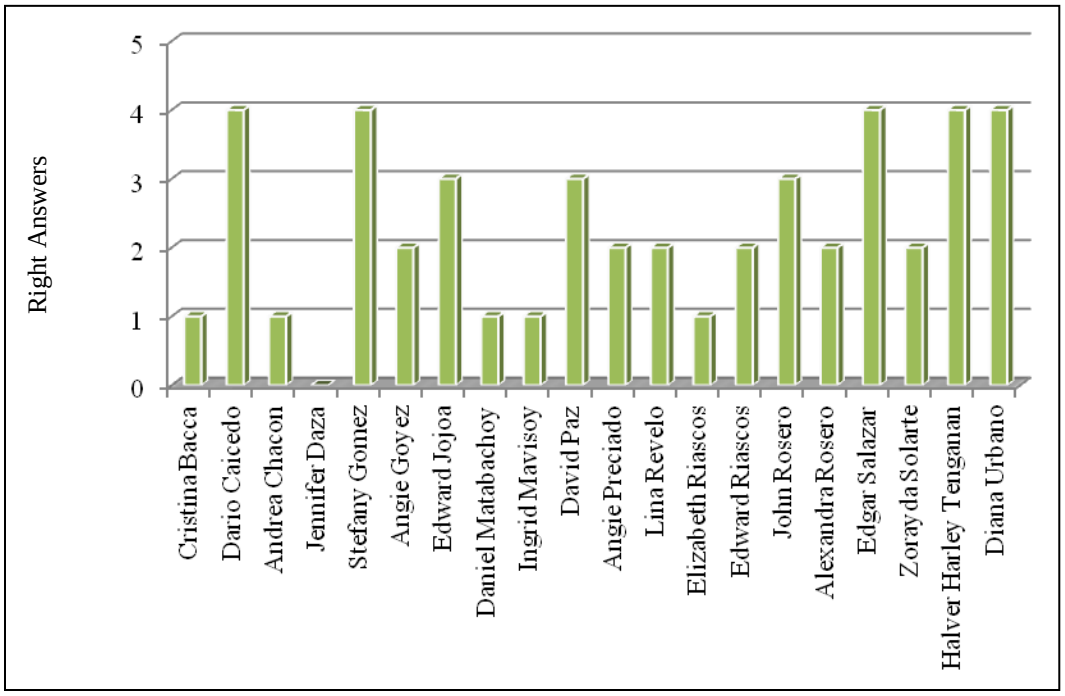

Figure 6. Individual results of reading test 3

From the third reading test results it is appreciated that there were more students (n=5 students) who scored four answers right out of five, if compared to the previous results where only two students reached that score. Nonetheless, there were also more students (n=5 students)

who scored only one. As a conclusion, it is evident that the heterogeneous results reflected the difference in the levels of reading comprehension among the students.

Figure 7. Group percentages results of reading test 3

Their performance as a group reached the 58% right answers, which means that the students showed a marked improvement in their reading comprehension level if compared to the previous tests results. Also, they have already exceeded the 50% total right answers. Therefore, the increase in the level of comprehension was progressive and it seemed to improve gradually from one session to another.

The fourth reading to be presented to the students was “Pencil Points”. This was a text of 183 words. Its vocabulary complexity increased so it was still necessary the adaptation of some words. The time allotted for the application of the technique was 50 minutes.

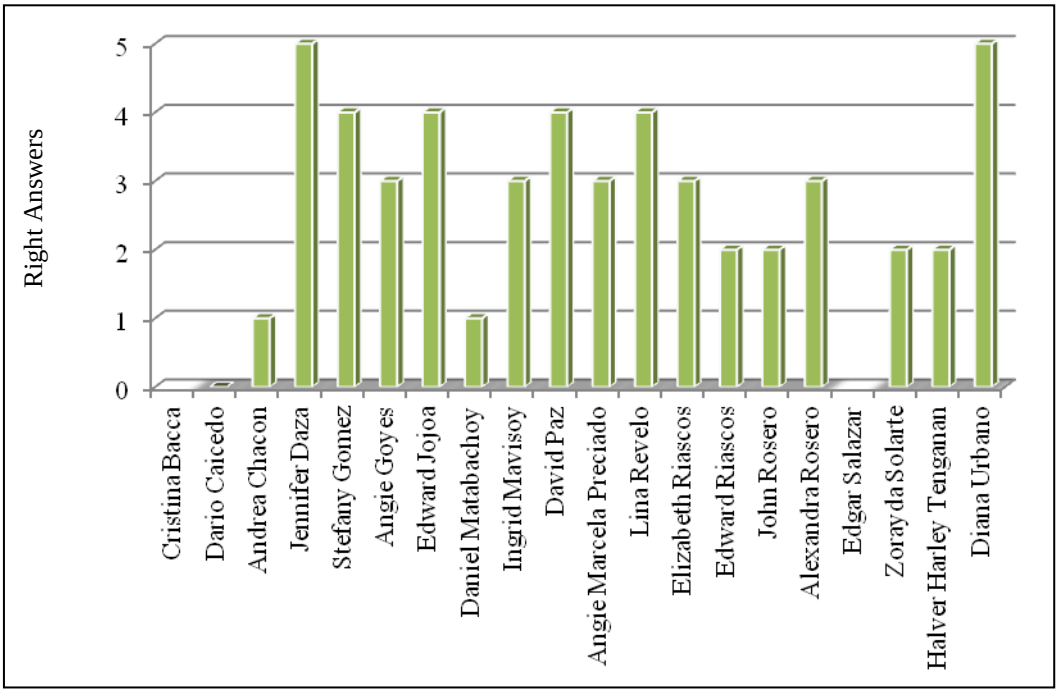

Figure 8. Individual results of reading test 4

From the fourth reading test results it is appreciated that the majority of students (n=11 students) scored from three to five answers right while only few students (n= 6 students) scored from one to two answers right. This means that the students' individual performance was not so heterogeneous if compared to the previous one, they showed an improvement which is evident by the fact that there were fewer students that got one or two answers right from one session to another.

Figure 9. Group percentages results of reading test 4

Their performance as a group reached the 56.66% right answers, which means that the students showed a slight decrease in their reading comprehension level if compared to the previous test results. Consequently, the reading comprehension level seemed to have increased since the beginning of the treatment and it is maintained in the two last sessions.

Now, the results of the reading comprehension tests of the readings divided into four pieces will be presented through graphics. There were four readings scheduled for four weeks in the following order of presentation: "Animal Migration", "The Four Leaf Clover", "Jersey Devil" and "The Haunted Oak Tree".

The fifth reading to be presented to the students, which was the first from this group of four-piece division, was "Animal Migration", a text of 265 words. Its vocabulary was also adapted to the students' level. Nonetheless, the complexity of the vocabulary increased for this group of readings because the number of adapted words was reduced. The time allotted for the application of the technique was 50 minutes.

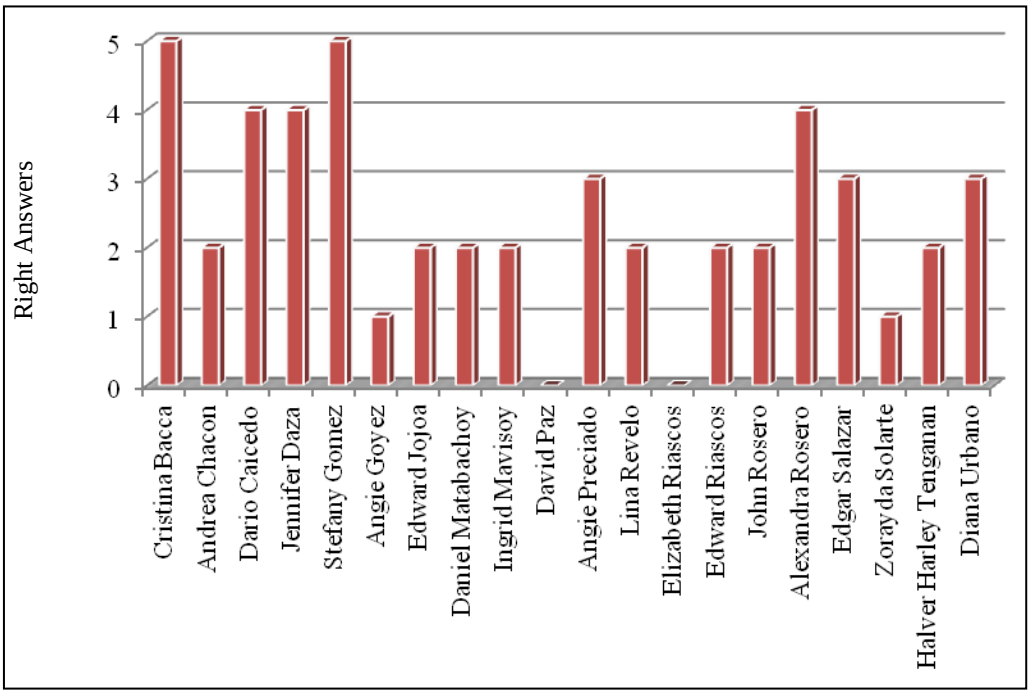

Figure 10. Individual results of reading test 5

From the fifth reading test results it is appreciated that there were two students who for the first time reached the total possible right answers (5 out of 5) and only two students who obtained only one right answer. For the rest of the group, the right answers ranged from two (n= 8 students), three (n= 3 students) and four (n= 2 students). In the figure, the students who obtained zero right answers are the ones who did not attend classes the specific day. Therefore, the students' individual performance continued to be heterogeneous; very few participants reached the highest levels, some of them reached an average and many continued in a low level. However, the last ones had also shown a modest improvement of their reading comprehension level at that point of the treatment.

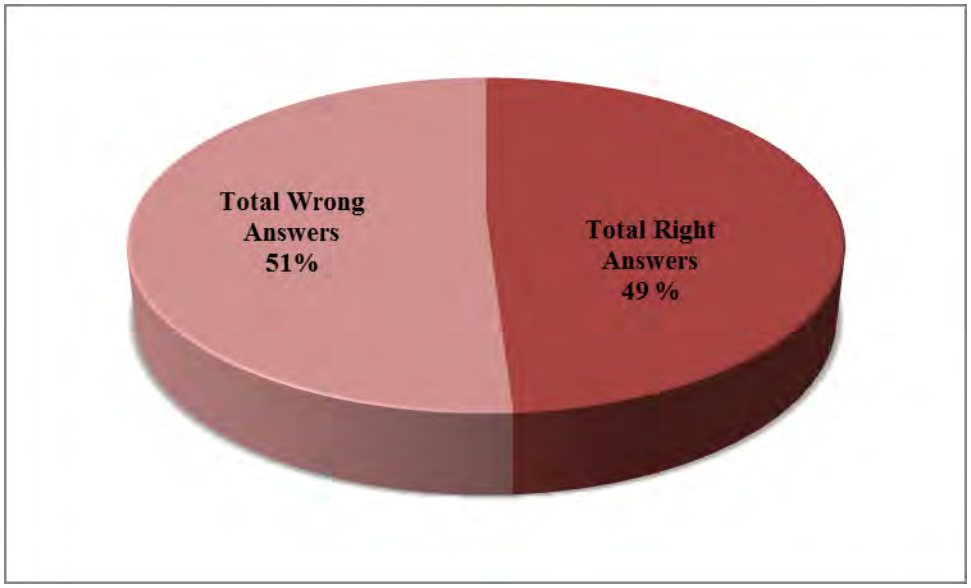

Figure 11. Group percentages results of reading test 5

Their performance as a group reached the 49 % right answers, which means that their achievement decreased if compared to the very last reading. Even when two students scored the total possible right answers, it did not represent an improvement as a whole. A possible explanation for these results could be the changes made to the vocabulary level of difficulty (fewer words adapted to the level of students) as well as the number of pieces the reading was divided into (four pieces).

The sixth reading to be presented to the students, which was the second reading divided into four pieces, was "The Four-Leaf Clover", a text of 360 words. Its vocabulary kept the same level of difficulty of the previous reading.

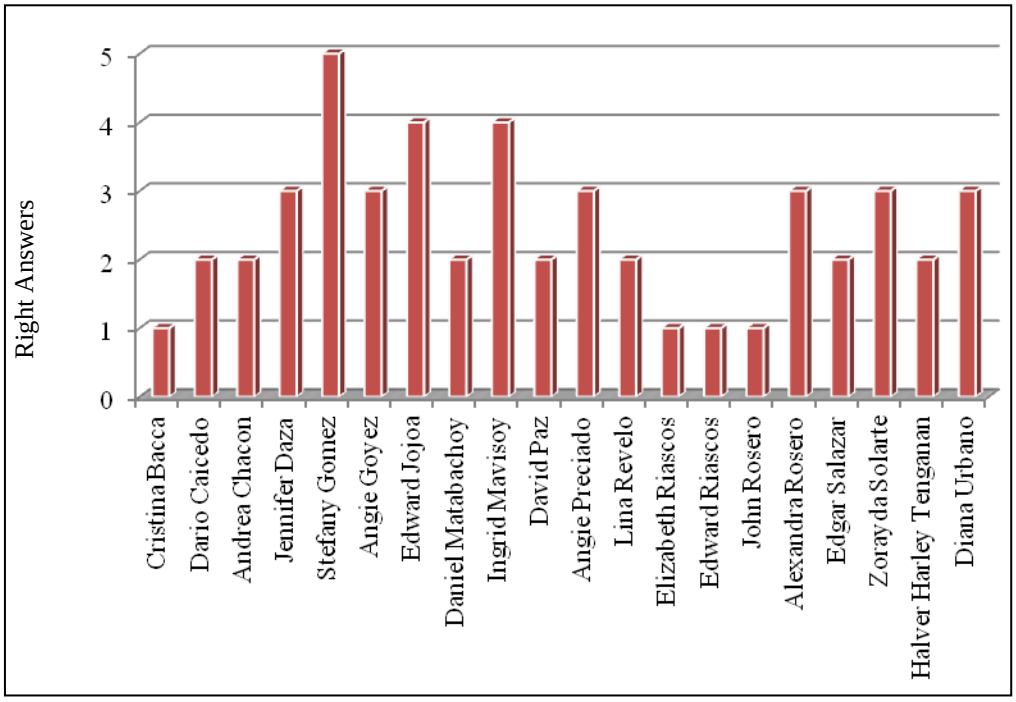

Figure 12. Individual results of reading test 6

From the sixth reading test results it is appreacited that the students' individual performance diminished since fewer students reached the total possible right answers (n=1 student) and the majority of students got from one to three answers right out of five.

Consequently, the results continued to be heterogeneous among the students due to the different levels of their reading comprehension ability which seemed not to reach a common level.

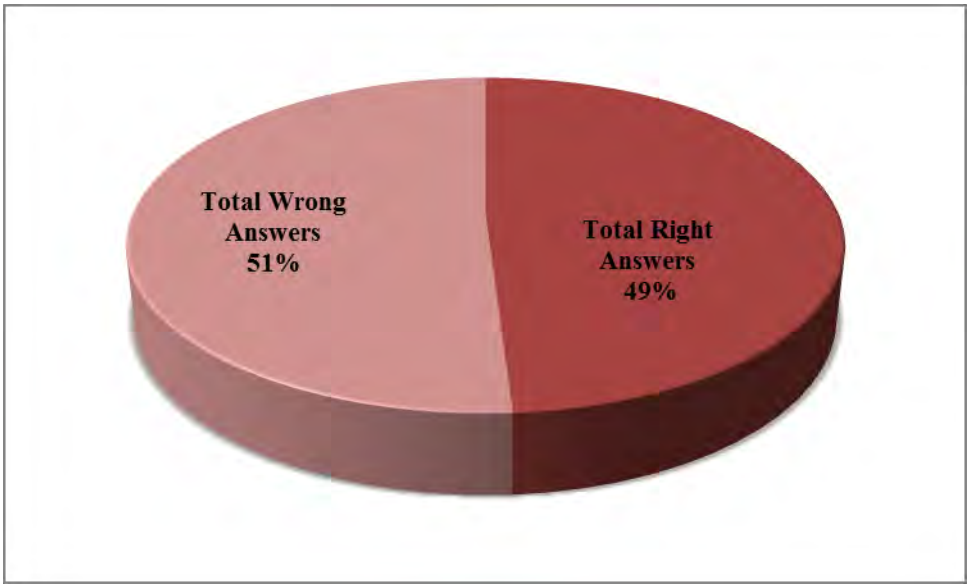

Figure 13. Group percentages results of reading test 6

Their performance as a group reached the 49 % right answers, which means that the results remained similar to the previous one. In general terms, it can be said that the students' reading comprehension level neither increased nor decreased if compared to the previous reading test results.

The seventh reading to be presented to the students, and the third one divided into four pieces, was "Jersey Devil". It was a text of 216 words. The students who got zero answers right were those who did not attend classes the specific day.

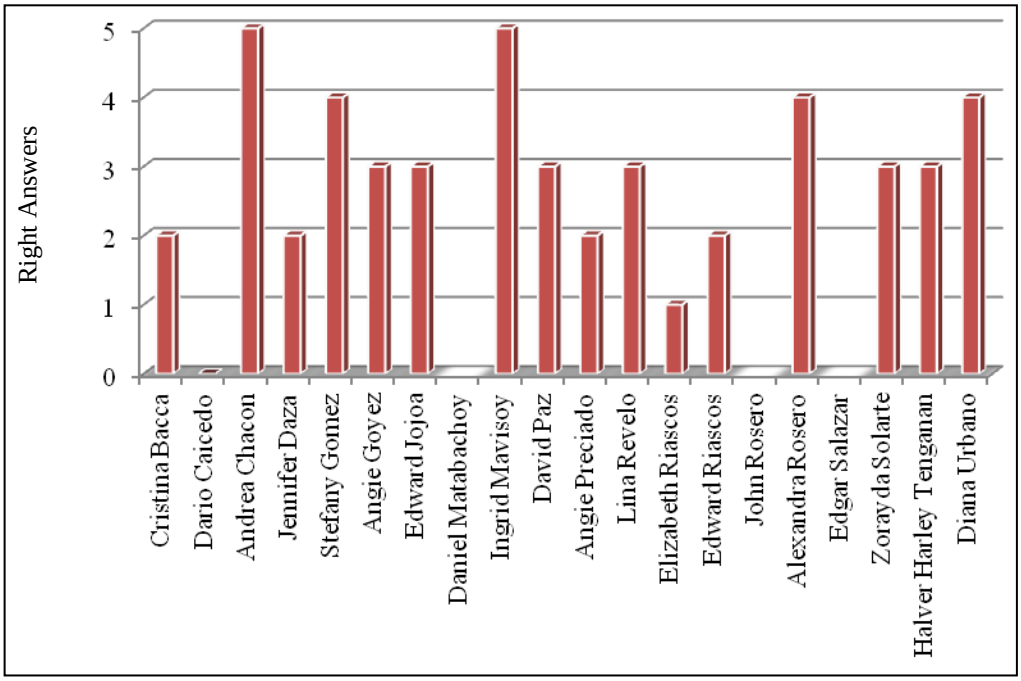

Figure 14. Individual results of reading test 7

From the seventh reading test results it is appreciated that the students' individual performance increased. Only one student got one answer right while the majority of students got from two to four answers right out of five and two students scored the total possible right answers.

Figure 15. Group percentages results of reading test 7

Their performance as a group reached the 57.64 % right answers, which means that there was a significant increase on the students' scores if compared to the previous reading tests results. It may be infered a positive development of the reading comprehension level since the beginning of the treatment.

The eighth reading to be presented to the students, and the fourth one of four-piece division, was "The Haunted Oak Tree". It was a text of 349 words. Its vocabulary kept the complexity of the previous readings of four-piece division.

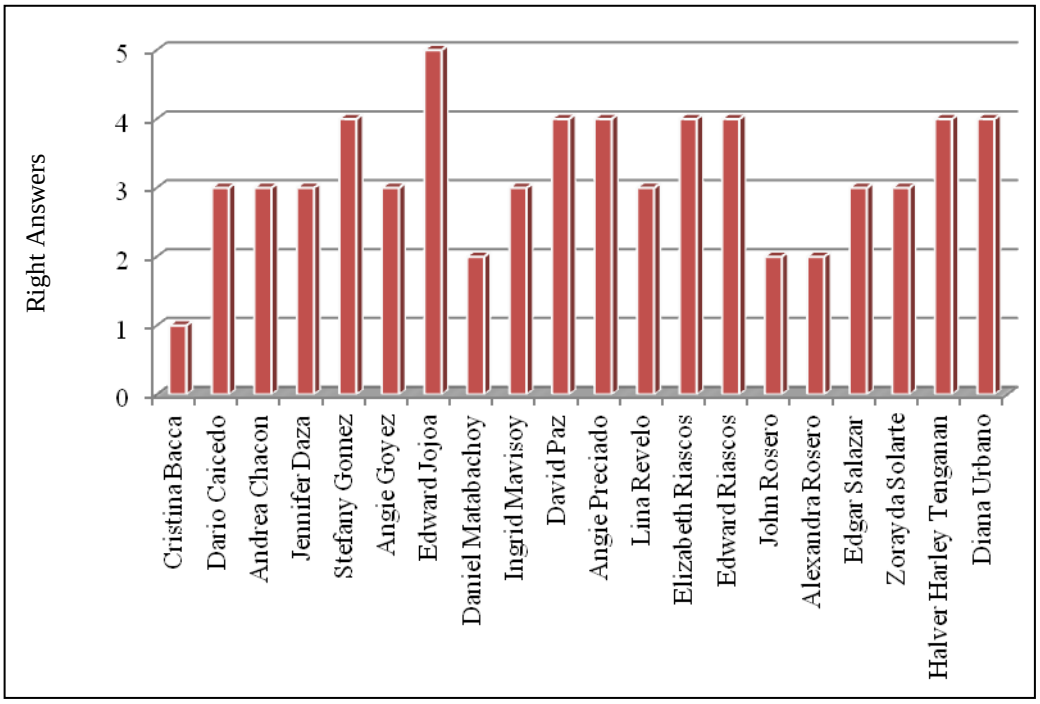

Figure 16. Individual results of reading test 8

From the reading test results it can be appreciated that the students' individual performance on the test increased, if compared to the previous one. Only one student got one answer right, one student got five answers right and the majority of students got from two to four answers right.

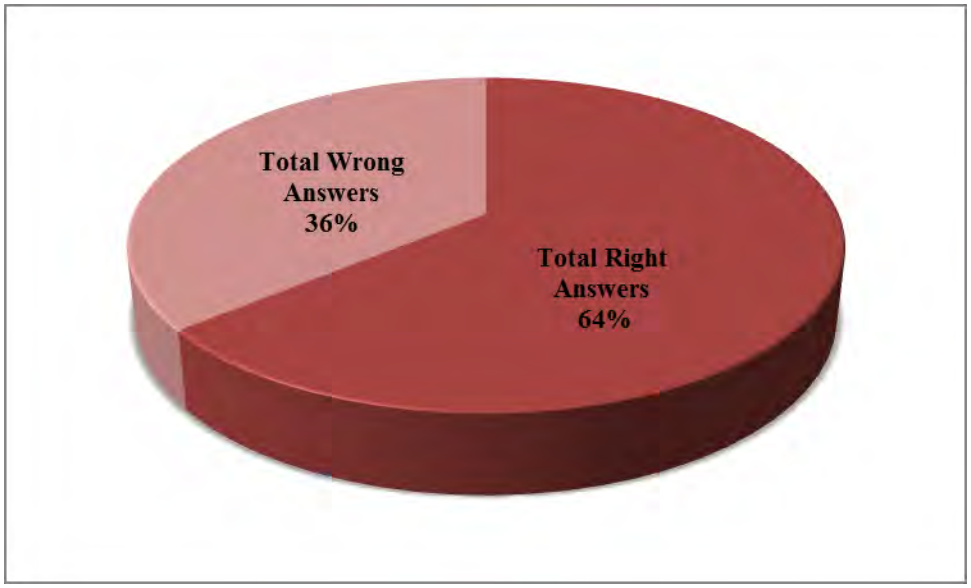

Figure 17. Group percentages results of reading test 8

Their performance as a group reached the 64 % right answers, which means that there was an evident increase on their scores if compared to the previous reading tests results. It can be said that the students' reading comprehension level kept on increasing from one session to another.

Now, the results of the reading comprehension tests of the readings divided into five pieces will be presented through graphics. There were two readings scheduled for the following two weeks which were "The Stolen Kidneys" and "Face book".

The ninth reading to be presented to the students, which was the first of the five-piece-division, was "The Stolen Kidneys", a reading of 350 words. Its level of difficulty increased because there were less adapted words.

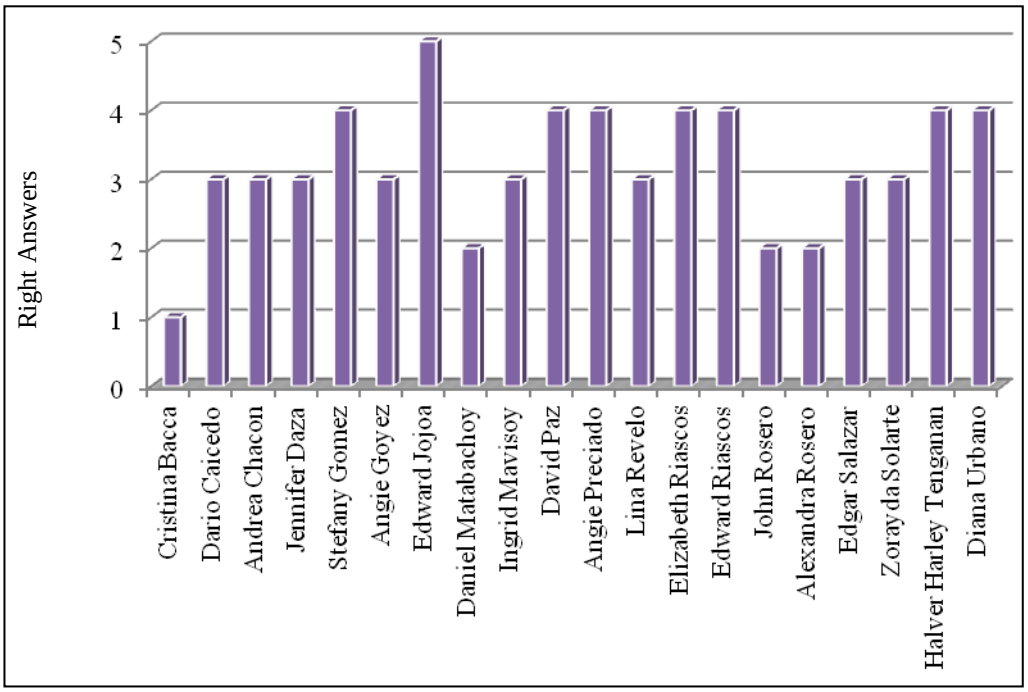

Figure 18. Individual results of reading test 9

From the ninth reading test results it is appreciated that the majority of students got from three to four answers right in the reading test. There were few students who got from one to two answers right and only one student who got five answers right. Thus, the students' individual performance remained similar to the previous one.

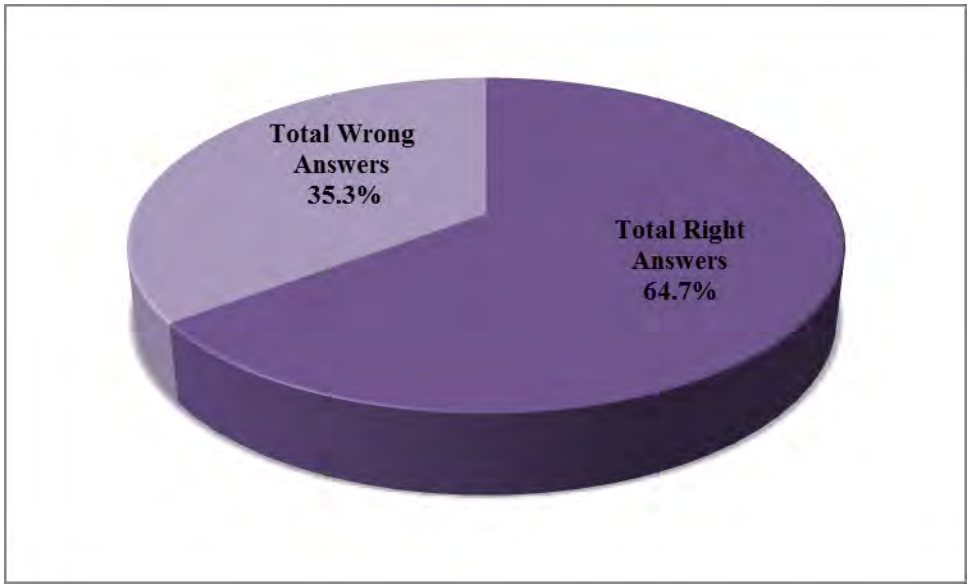

Figure 19. Group percentages results of reading test 9

Their performance as a group reached the 64 % right answers, which means that the results remained similar to the previous one. In general terms, it can be said that the students' reading comprehension level neither increased nor decreased if compared to the previous percentage result.

The tenth reading to be presented to the students, which was the second and the last one of the five-piece division, was "Facebook", a text of 197 words. Its vocabulary was similar to the previous reading in terms of complexity.

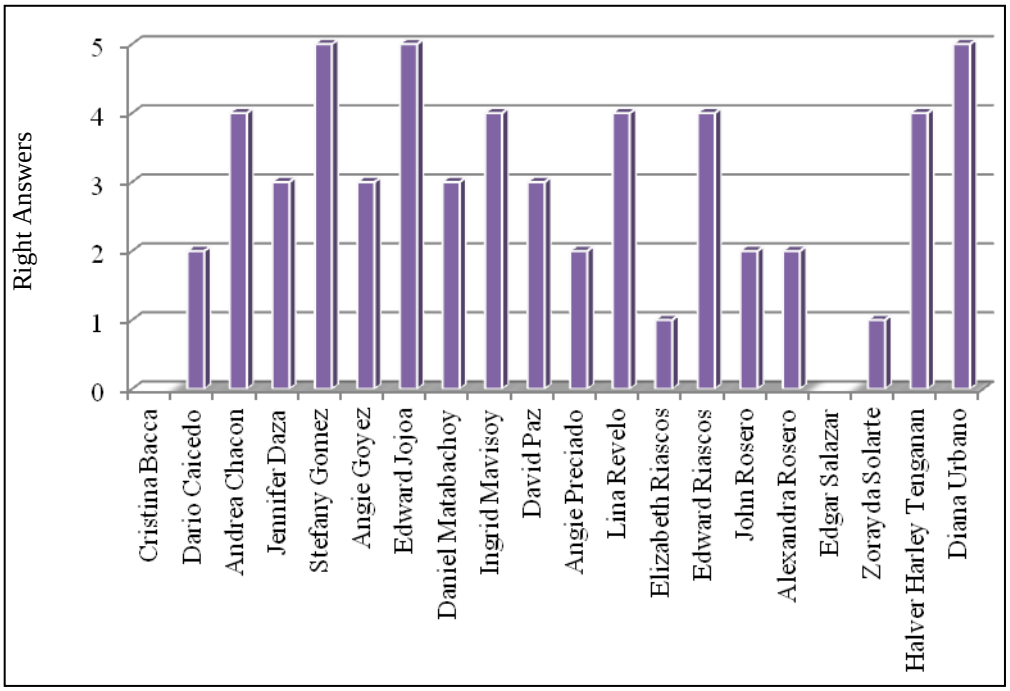

Figure 20. Individual results of reading test 10.

From the tenth reading test results it is appreciated that there were fewer students (n=5 students) who scored four answers right out of five, compared to the previous results where seven students reached that level. Nonetheless, there were also more students (n=3 students) who got five answers right. The half class maintained their scores from one to three right answers.

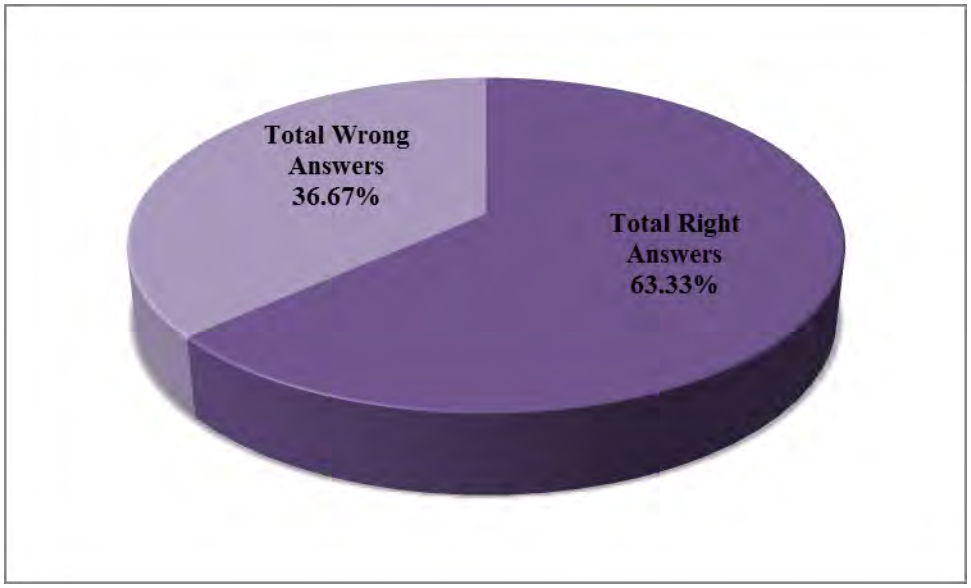

Figure 21. Group percentages results of reading test 10

Their performance as a group reached the 63.33 % right answers, which means that the students' increase in their level of reading comprehension was consistent and similar if compared to the last three sessions.

Following the procedure selected for the application of the jigsaw technique, the next two weeks, two reading divided into six pieces were presented. The readings were taken from an online book and the second one was chosen from an article on internet. Their vocabulary was not adapted. As this division was the most numerous the students had to organize, they were given more time, for the first step of the technique (organizing the pieces of paper of the reading individually) as well as for the second step (group discussion).

The eleventh reading to be presented to the students, which was devided into six pieces was "The Mystery of the Maya", a text of 508 words. Its vocabulary complexity was higher because it kept the words of the original version of the text.

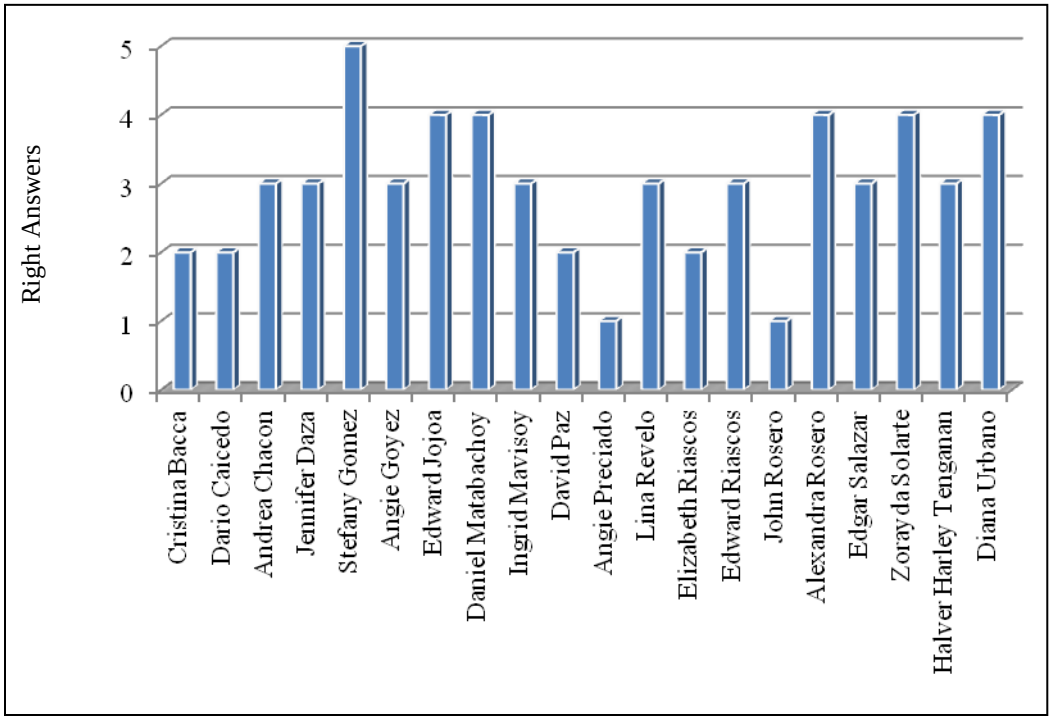

Figure 22. Individual results of reading test 11

From the eleventh reading test results it is appreciated a decrease on the students' individual achievement. Only one student got five answers right out of five, five students got four answers right, the majority of students (n=12 students) got from two to three answers right and two students scored only one right answer.

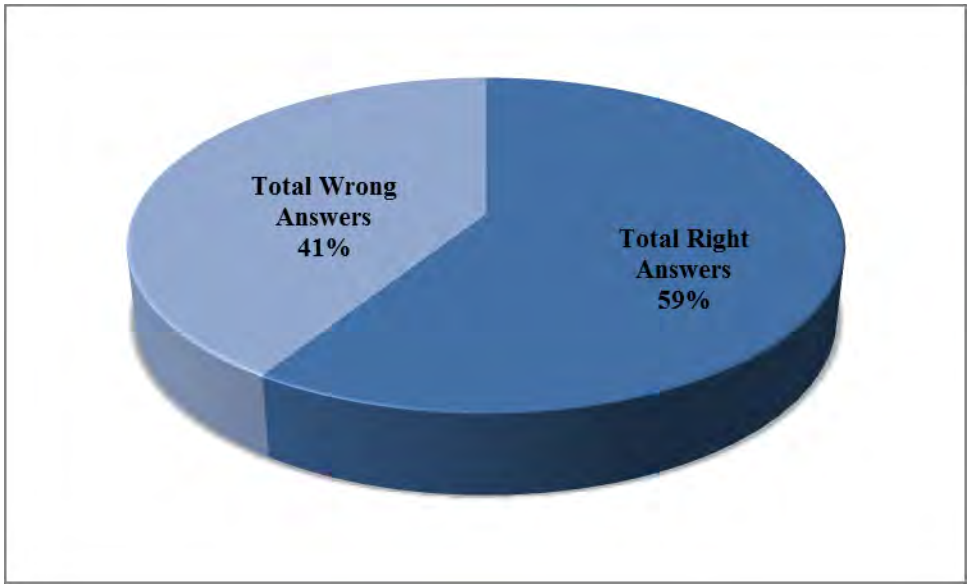

Figure 23. Group percentages results of reading test 11

Their performance as a group reached the 59 % right answers, which means that the group decreased in their scores if compared to the last two reading tests results. This may be attributed to factors such as the number of divisions of the reading and the difficulty of vocabulary which was not adapted. Nonetheless, the results were not lower than the ones in the first reading test results. It could demonstrate that the students' reading comprehension skill showed a development.

The twelfth and the final reading to be presented to the students, which was divided into six pieces, was "Albert Einstein", a text of 350 words and its vocabulary was not modified from the source it was taken.

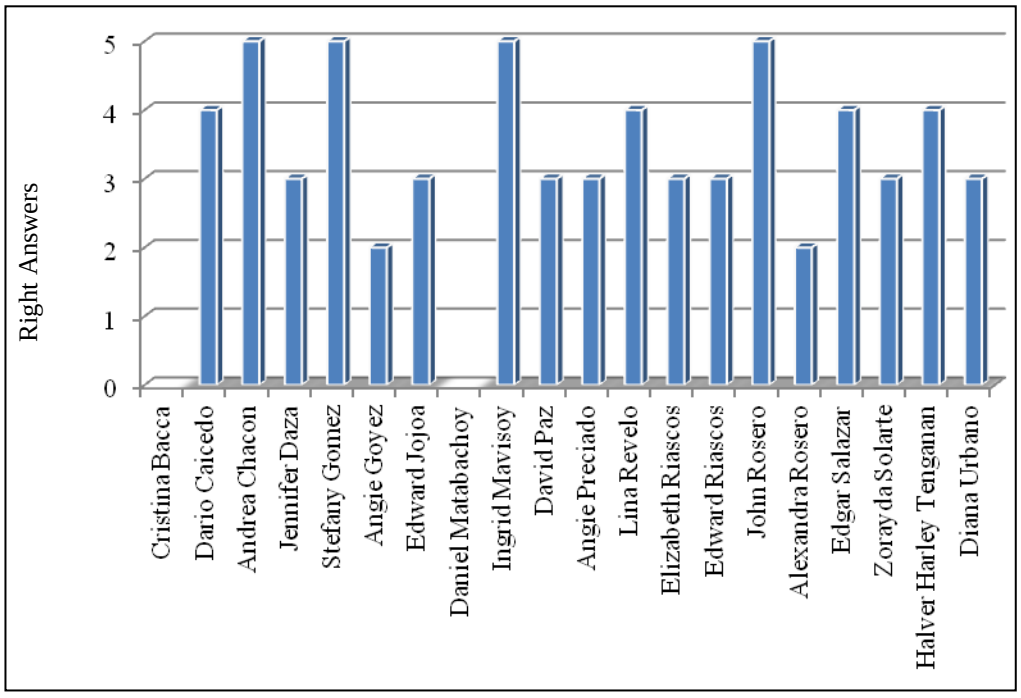

Figure 24. Individual results of reading test 12

From the twelfth reading test results it is appreciated that the scores obtained were the highest of all the application. Only two students got two answers right and it represented the minimal score in this test, seven students got three answers right, four students got four answers right and five students got the total possible answers right (5 out of 5). It can be said that their individual performance was consistent and improved along the application of the treatment.

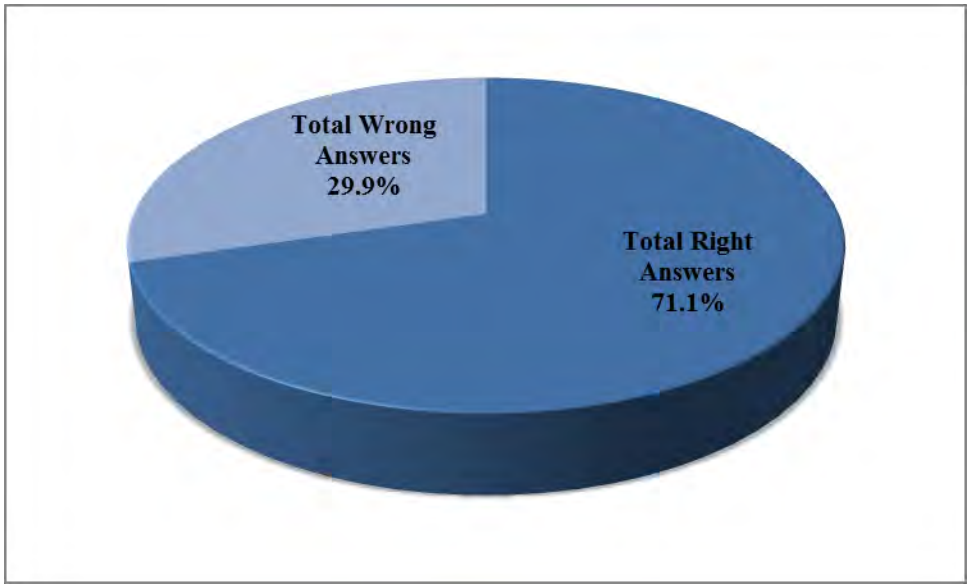

Figure 25. Group percentages results of reading test 12

Their performance as a group reached the 71.1 % right answers which means that the results considerably increased if compared to the previous results. In general terms, it can be said that there was indeed a clear difference between the first application of the technique and the last one.

A comparative figure of all the readings results is presented below.

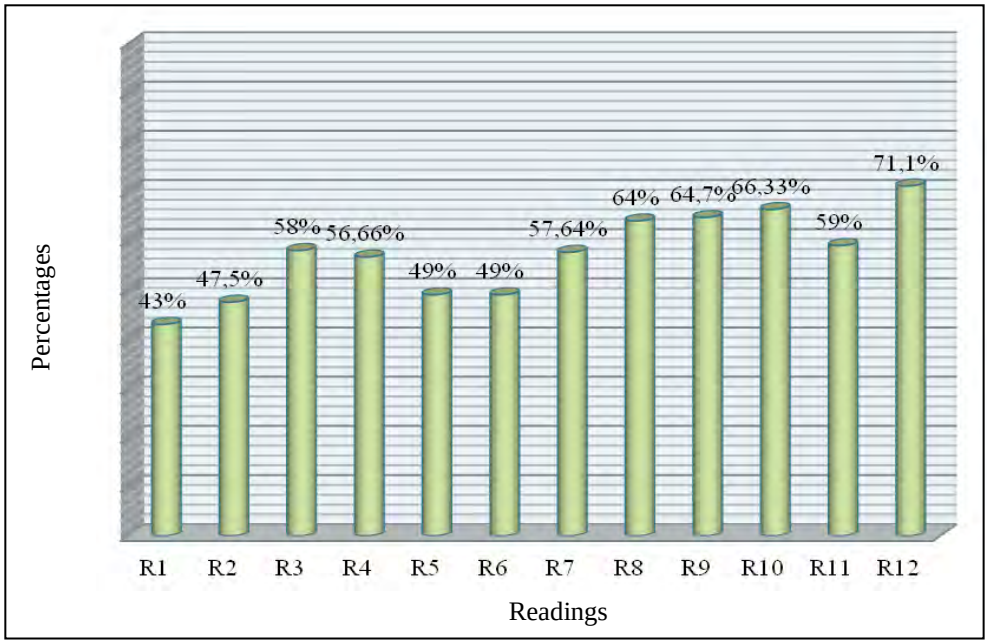

Figure 26. Comparative graph of the reading tests results

Figure 26 shows the performance of the group in the reading tests during the treatment which was carried out during twelve weeks. In general terms, an increase is observed from the first reading to the last reading. However, the results do not always display an increase; there are some readings which show a decline. The factors that could have intervened in those drops will be explained below.

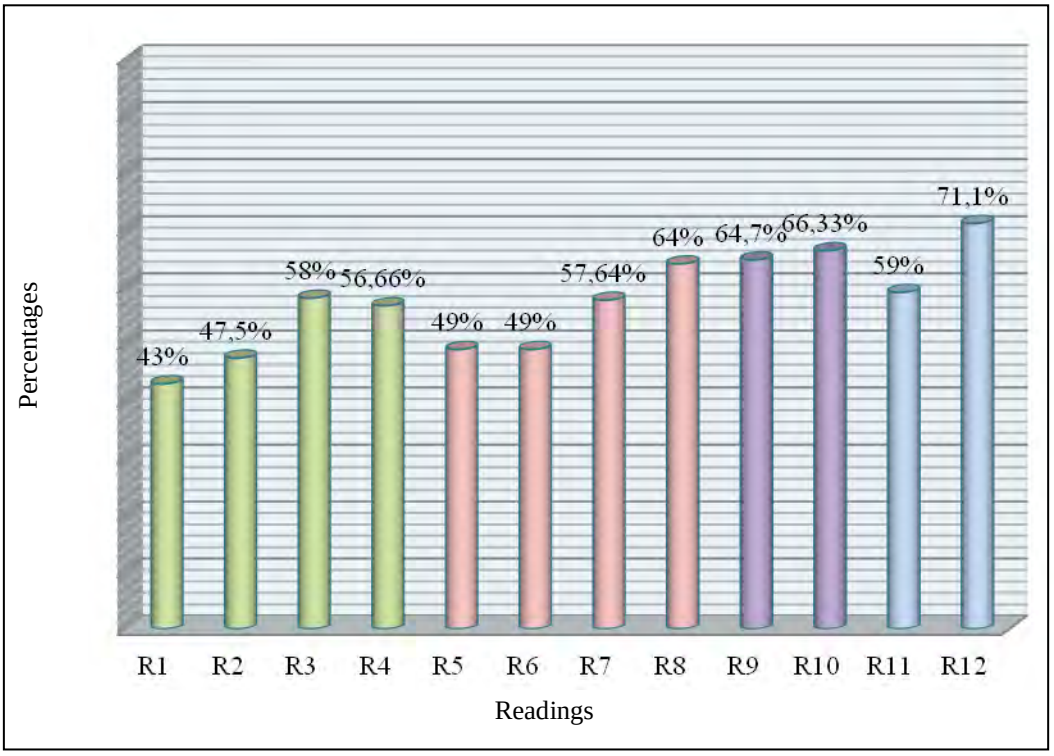

Figure 27. Comparative graph of the groups of readings according to their division.

It can be appreciated that from the reading number one (R1) to the reading number four (R4) which were the group of readings divided into three pieces, the percentages ranged from 43% to 58%. This achievement showed that there was an increase from week one to week four. However, for the fifth reading which was the first reading divided into four pieces and whose vocabulary was more complex, it is observed a decline in the test results, going from (R4=56.66%) to (R5= 49%).

On the other hand, from reading number five (R5) to reading number eight (R8) which were the group of readings divided into four pieces, the percentages ranged from 49% to 64%. This means again an increase on the students' performance. For the group of readings divided into five pieces (R9 and R10) the percentages went from 64.7% to 66.33%. In this transition of readings there was not a drop. Instead, the reading comprehension level modestly increased compared to the last readings. Here, it can be observed that from reading number eight (R8) to

reading number ten (R10) the results tended to be similar to one another. Nonetheless, when changing the number of divisions of the readings , there was again a drop in the test results, going from reading number ten (R10=66.33%) to reading number eleven(R11=59%).

Finally, for the last group of readings, R11 and R12 which were divided into six pieces, the percentages ranged from 59% to 71.1%. If compared to the whole readings' percentages, the last one was the highest score of the students in all the treatment.

A common feature is that the drops are present when the students faced the change in the number of divisions of the readings, except for the group of five-piece division where the performance was similar to the previous one. Then, the drops were present in readings five (R5) and reading eleven (R11) as shown in figure 28.

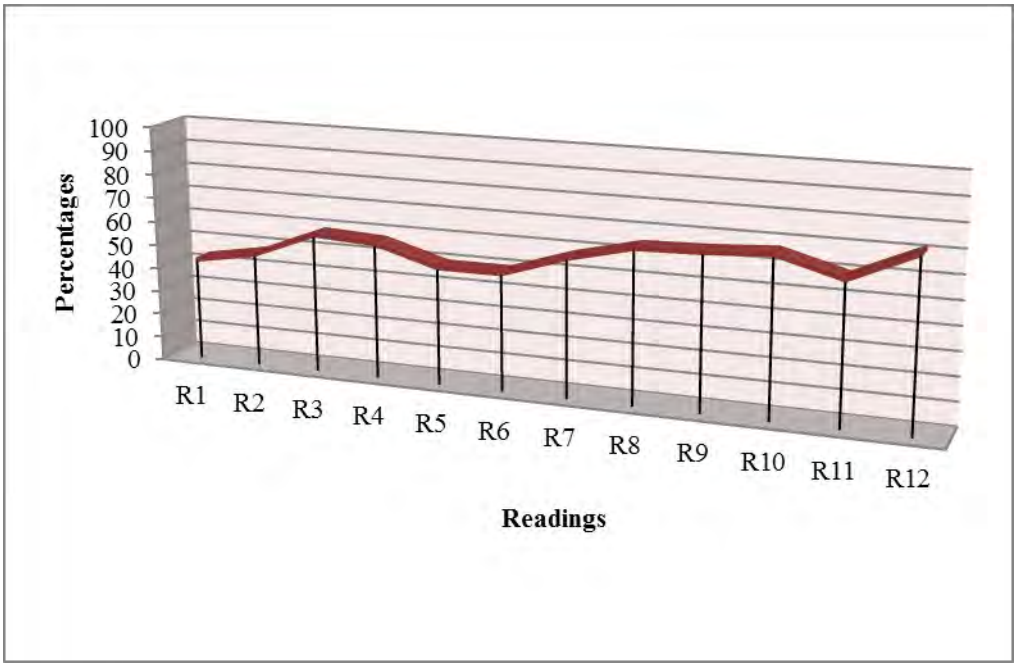

Figure 28. Drops present among the readings during the treatment.

After the whole application of the jigsaw technique it can be appreciated that there was a difference between the results obtained from the first reading tests and the final ones showing an increase in the reading comprehension level. However, there were some aspects considered as relevant to be described after the application of the treatment.

Regarding the procedure and the results obatined from each reading and groups of readings, some declines were evident when the number of divisions of the readings increased from 3 to 4 and from 5 to 6. Then, there were two drops along the treatment in reading five (R5) and in reading eleven (R11) as shown in figure 28.

It may be attributed to the increase of the level of complexity in the procedure when the division of the readings went from few pieces to more pieces. Also, this required more concentration from the part of the students.

Nonetheless, when the readings were divided into more pieces the levels of comprehension increased, in general terms. For instance, when the readings were divided into four pieces, the students' performance increased if compared to the previous group of readings of three-piece division. In the same way, when the group of readings was divided into five pieces, there was a modest increase if compared to the previous group of readings divided into four pieces but there was not a significant difference among them. Finally, when the readings were divided into six pieces, the students' performance decreased for the first reading test of this group and increased for the second reading test. Nonetheless, the performance in this last group of readings was higher than the previous groups of readings.

This higher performance in reading comprehension may be attributed to the number of times the students read each paper before organizing the whole reading individually. In addition,

they had the chance to read the pieces of paper in the group discussion step and re-organize the reading if necessary. Besides, through the group discussion they could revise specific details or aspects of the reading that they did not probably see in the individual reading.

An important aspect to mention is that even when the vocabulary level of difficulty was changed, it seemed not to have any effect on students' reading comprehension ability as well as the number of words of each reading.

After the aplication of the treatment, the students of both experimental and control groups took the post-test, then it was possible to discover if there was a change in their levels of reading comprehension. The following graphic illustrates the results obtained in the post-test.

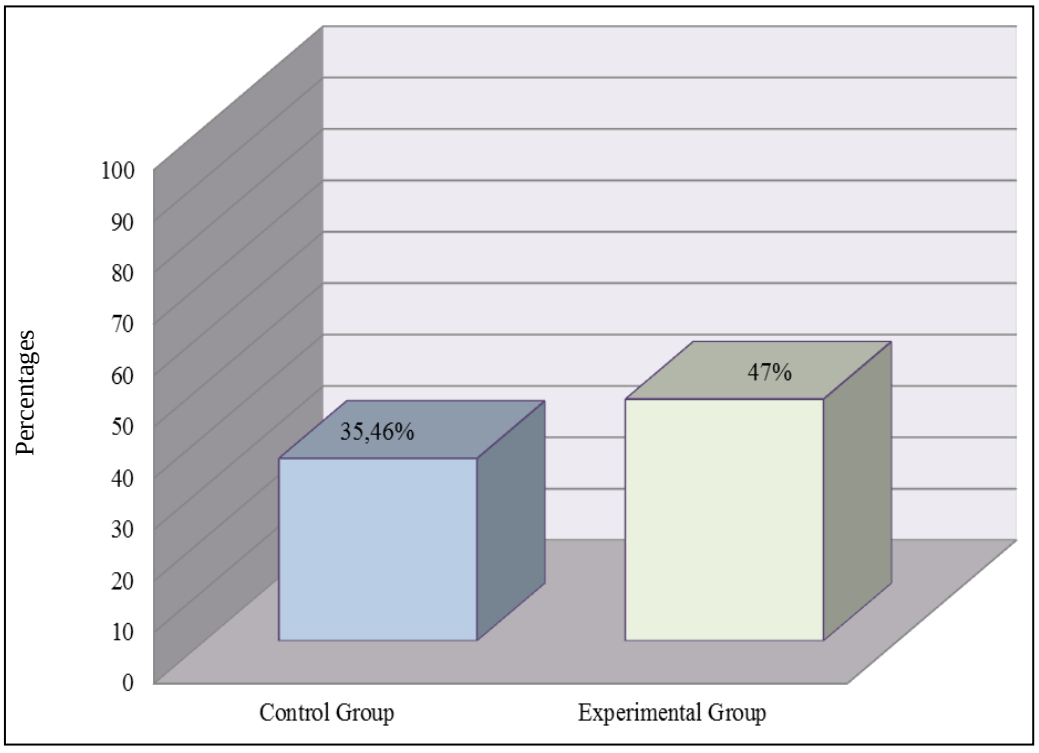

Figure 29. Control and experimental groups post-test results.

The results of the post-tests in the control and experimental groups showed that there was a difference of 11.54 points in the percentages between the experimental and control group's performance. It can be inferred that there was a considerable difference between the levels of reading comprehension in the experimental and control group after the application of the Jigsaw technique.

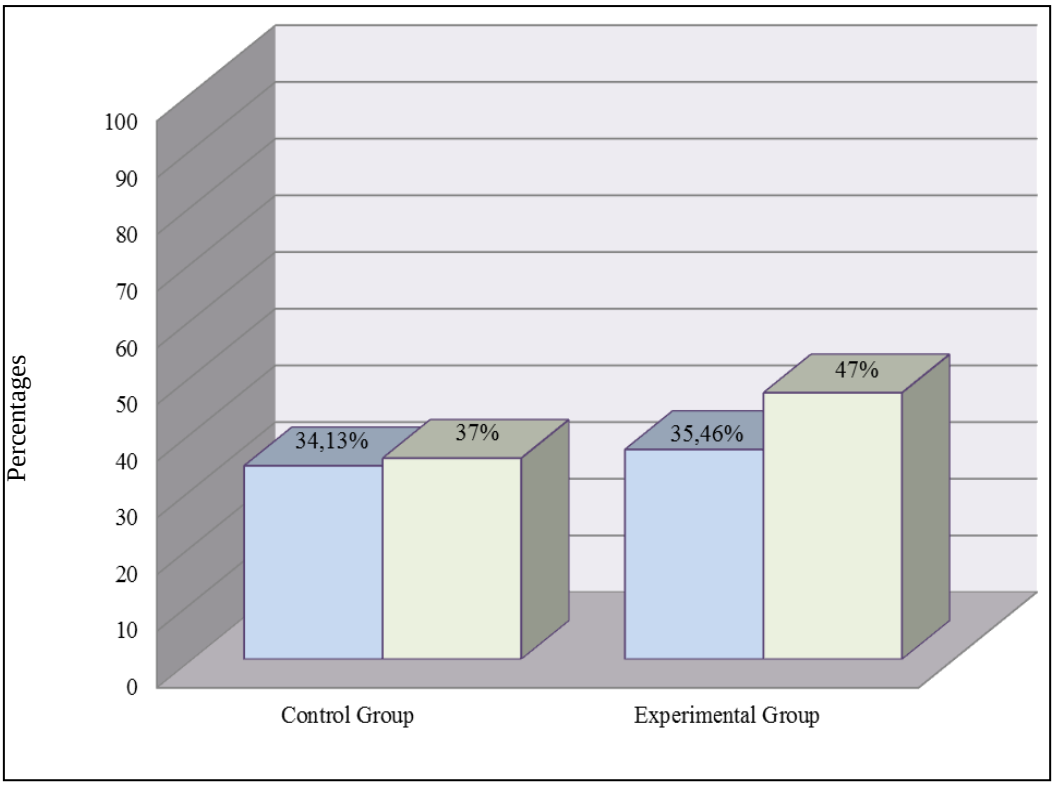

Figure 30. Pre-test and Post-test Results in control and experimental group.

According to figure 30 it can be said that in the control group there was no significant increase between pre-test and post-test for the reading comprehension level. Yet, the experimental group presented a significant increase between pre-test and post-test after the application of the treatment.

In this study, independent samples *t* test of the data obtained from the post-tests were carried out.

The *t*-test was used in order to explore whether there were significant differences between the experimental (jigsaw group) and control (non-jigsaw group) in terms of their reading comprehension tests scores after the treatment.

Table 3**.**

Post-test t Test Results

Test	Group	N	Mean (M)	Standard deviation	Variance	p*
Post-test	Control Non-jigsaw	25	5.32	1.89	3.56	0.0068
Post-test	Experimental Jigsaw	20	7.05	2.11	4.47	

*P**<0.05

Table 3 shows that there is a difference between the experimental group and the control group in terms of their post-test scores. It can be seen that the mean of the post-test in the experimental group (M: 7.05) is higher than the mean of the scores of non-jigsaw group (M: 5.32). As a result, it can be said that the average right answers of a student of the experimental group was seven out of fifteen while the average right answers of a student from the control group was five out fifteen.

Also the *p* value of the experiment was determined in order to know the probability of finding the same results in similar studies. This *p* value had to be less than 0.05 in order to be significant for this study.

The *p* value of this study was 0.0068 which indicates that in 10,000 studies only 68 would not display the same results. In few words, the *p* value obtained was considerably lower than the *p**0.05 which means that the null hypothesis was rejected and that the results obtained were statistically significant.

Survey results. After the application of the treatment, the students were asked to respond to a survey, which was applied in Spanish, in order to know their degree of aceptance of the technique, the materials used and its pertinence. (see Appendix H for complete proof).

This survey was analyzed through Likert scale where the students' answers represented the level of agreement or desagreement of five statements to capture the intensity of their feelings for a given item.

The format to measure the students' answers ranged from one to five where 1 meant nothing, 2 little, 3 somewhat, 4 much 5 a great deal, expressed in Spanish as:

1= "Nada"

2= "Casi nada"

3= "Poco"

4= "Mucho"

5= "Completamente"

Now the graphics representing the students' level of agreement or desagreement for each statement will be illustrated below.

For the statement number one which intended to discover the extent to what the technique improved the reading comprehension, expressed in Spanish as: "¿En qué medida cree usted que mejoró su comprensión lectora con la técnica aplicada en clase?" the average of the students'

answers was 4.1 points out of five in the Likert scale which means that the effect of the technique was seen as positive because the results were statistically significant.

Figure 31. Survey results for question 1 in Likert scale.

For the statement number two which intended to determine the liking of the procedure, expressed in Spanish as"¿En qué medida le gustó la forma de abordar la lectura con la técnica realizada en clases?" the average of the students' answers was 4.5 points out of five in the Likert scale which means that the acceptance of the procedure was statistically significant.

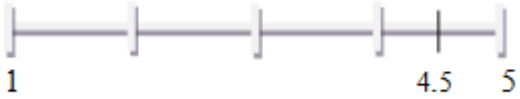

Figure 32. Survey results for question 2 in Likert scale.

For the statement number three which intended to measure the students' level of agreement with the application of a test at the end of the sessions, expressed in Spanish as "¿En qué medida cree usted que el test al final de cada lectura es conveniente para su aprendizaje?" the average of the students' answers was 4.8 points out of five in the Likert scale which means that the acceptance of the reading tests was nearly complete.

Figure 33. Survey results for question 3 in Likert scale.

For the statement number four which intended to discover the extent to which the students regarded the technique as an effective preparation for the *Pruebas Saber 11* national exam, expressed in Spanish as "¿En qué medida cree usted que esta técnica de lectura favorece su preparación a las Pruebas Saber 11?" the average of the students' answers was 4.6 points out of five in the Likert scale which means that for the students the technique was highly pertinent for their academic purposes.

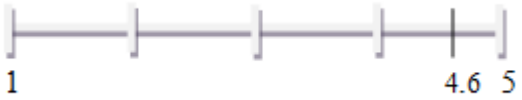

Figure 34. Survey results for question 4 in Likert scale.

For the statement number five which intended to determine the liking of the materials presentation, expressed in Spanish as "¿En qué medida le parece conveniente la presentación del material de la lectura?" the average of the students' answers was 4.9 points out of five in the Likert scale which means that the linking of the materials presentation was statistically significant.

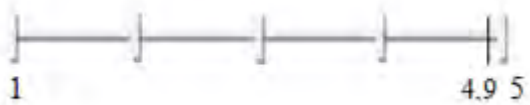

Figure 35. Survey results for question 5 in Likert scale.

In general terms, according to the survey's results the students showed a significant level of acceptance and positive attitude towards the jigsaw technique and the way it was developed during the fourteen weeks because of the materials presentation, the relevance it had for their academic purposes and the procedure itself.

Conclusions and Discussion

After the analysis of the data, it was found that the jigsaw technique as part of Cooperative Language Learning method was more effective for the development of the reading comprehension skill than the usual instruction applied in the public high school IEM Ciudadela in Pasto; therefore, the null hypothesis was rejected.

According to the pre-test results the students in the control and experimental group did not have a significant difference in terms of their reading comprehension level which was measured through reading comprehension questions following the model of the *Pruebas Saber 11* national exam while in the post-test results students in the jigsaw group reported more comprehension of readings such as the ones they would face in the national exam.

Furthermore, the fact that Jigsaw belongs to the Cooperative Language Learning method whose main feature is group work and at the same time the reading skill which is mainly an individual activity, made it necessary to adapt the third model of jigsaw to a new one that suits those features, then a new model of jigsaw emerged to develop the reading skill.

Such adaptation that consisted of the increasing number of divisions of the readings from three to six pieces proved to affect positively on the development of the students' reading comprehension skill. It can be inferred that the level of reading comprehension increased when the stories were divided into more pieces. Therefore, it is advisable for the implementation of this model of jigsaw technique to use readings divided into three pieces until six pieces.

In addition, the findings of the present study indicate the positive effects of cooperative language learning on students' reading comprehension as well as on the students' lack of

vocabulary which was evident since the beginning of the treatment. This last weakness seemed to be minimized during the application of jigsaw technique.

This model of Jigsaw had positive effects not only on students' reading comprehension but also on the aspects that the reading process implies such as the vocabulary knowledge, the coherence and cohesion of ideas and the willingness towards reading.

Moreover, the significant improvement of the students' reading comprehension level after the application of the treatment proved that the technique could serve as preparation for the *Pruebas Saber 11* national exam.

Also, the findings provide teachers with more empirical support for promoting effective changes in teaching methods to improve students' learning, and their attitudes towards learning, in the current wave of educational needs. Teachers are always required to implement current methodology in order to improve education and there are many good methods to choose but one thing is how those methods work effectively in the contexts they were tested and another different thing is how they may work in this context which might be completely different.

Regarding the students' attitudes towards the technique which were determined through Likert scale, the students preferred the cooperative language learning presented through jigsaw technique to the more traditional student-centred approach to which they were commonly exposed. The students showed great acceptance of the technique in terms of its procedure, materials and pertinence as it was proved in the results of the survey which were considered to be highly favourable.

Finally, this research was one of the first efforts to apply cooperative language learning for developing an individual skill, such as reading comprehension over a contextualized need

like improving the results of the *Pruebas Saber 11* national exam. It is difficult to generalize the effect of this Jigsaw technique based on the results of one pre-experimental research of short duration. In order to identify radical changes, a more prolonged and intensive treatment may be needed.

Pedagogical Implications

For the purpose of this study, the original Jigsaw technique was modified to suit a receptive skill, in this case, reading comprehension. Its peculiarity lies on the progressive increase of the level of difficulty by means of the number of divisions of each reading. It was found that even when the reading comprehension skill is commonly developed individually; it could be improved through cooperative work towards an individual goal as the national exam is.

An advantage of the cooperative work applied during the treatment is that the lack of vocabulary could have less negative impact in the group discussion step. After having read the pieces of paper individually, the students shared their ideas about the possible organization of the text and some of the meanings of the words that they did not know at the beginning were discovered in the group work step. Thus, the cooperative work in the treatment allowed the students to learn vocabulary from their classmates. Besides, a positive aspect to consider from this step is the students' development of strategies for reading. When organizing the text the students started to formulate hypothesis about the readings, look for coherence and cohesion in their versions and in their classmates'. Finally, this step fostered the students' positive attitude towards reading. Taking an individual process like reading towards a cooperative one seems to increase the interest of the students. They remained active and attentive during each session of class.

Furthermore, students' attitude was positive in terms of their responsibility displayed in two aspects; what they had to share with their classmates in the group work phase and at the end of each session with the reading comprehension test. As the purpose of the reading was clearly stated, it fostered the students' sense of responsibility and interest.

The last aspects contemplated to have fostered the students' interest in the readings were the instruments and the materials. The first one which was the pre and post-test similar to the *Pruebas Saber 11* boosted the students' willingness to take part in the development of the technique. The second one which was the readings divided into pieces was a new methodology that challenged the students, contrary to the methodology they were used to.

Pedagogical Recommendations

For an optimal development of this technique it is advisable to consider some aspects in each step as explained below.

In the warm up phase, students need to be engaged in the guessing activity to infer the topic of the reading from the title that the teacher gives at the beginning. It may be necessary sometimes to ask them individually if they do not want to participate voluntarily.

For the materials distribution in the second phase, individual reading; teachers may want to be careful with the physical presentation of the materials so that it does not affect the students' individual reading process. In the same phase, it is recommended to take an average time for the individual reading, thus the reading process will neither be overwhelming to the low level students nor too simple to the high level students.

In group discussion phase it is advisable that the teacher organize the groups to avoid misbehaviour; therefore, the teacher chooses the students randomly in every session. Besides, as some of the students may not want to participate actively in the group discussion, one of the teacher's roles would be to monitor constantly the students' work.

For the final phase of this jigsaw technique the teacher should be careful not to include unknown vocabulary in the test because the purpose of such tests is not to evaluate vocabulary but the reading comprehension skill.

Limitations

The limitations that appeared carrying out this research were the few students' negative attitude which could be the result of the lack of engaging activities in the classroom; the schedule with the limited number of hours per week and the students' willingness towards a new technique which challenge them in a way they were not used to.

Another relevant limitation was the fact that some students skipped the sessions. It may affect the results of the treatment because they interrupted their process. Finally, it was also a constraint the administrative requirement of giving a grade for each session of class. It exerted pressure on the students which may influence their willingness to participate in the development of the technique along the treatment.

Further Research

The procedures used to implement the jigsaw technique in this study did not focus on vocabulary. Despite the effectiveness of the jigsaw technique the students showed willingness to learning new words. Further studies should therefore integrate a lexical approach to the previous study or new studies.

As only few research studies have investigated the effectiveness of cooperative learning for overcoming the low results in English in the national exam, the findings of this study are not enough for deciding on the optimal use of cooperative learning at all levels of education in

Colombia. A series of further studies on cooperative learning at the primary and secondary levels of education should therefore be undertaken.

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Appendix A,

Lesson Plan

Lesson Plan

Reading 1 **Time framework: 1 hour (55 min)**

Grade: 11º	Subject: English	Prepared by: Diana Cristina Botina- Diego Alberto Ortiz

Objectives:

- Students will be able to demonstrate comprehension of the passages by answering questions which require basic understanding and interpretation of the content.

Standards addressed:

Students apply strategies to comprehend text, including structural knowledge, and contextual interpretation.

Students understand varied types of readings on different topics. Taken from Estándares Básicos de Competencias en Lenguas Extranjeras: Inglés.

Students select and apply appropriate strategies of reading to the text and the task. Taken from Estándares Básicos de Competencias en Lenguas Extranjeras: Inglés

Students analyze narrative and argumentative text in order to understand the main idea and specific details. Taken from Estándares Básicos de Competencias en Lenguas Extranjeras: Inglés

Aim: Carrying out the Jigsaw technique during the lessons. **Materials:** Reading selection & student worksheets.

	will share the order they gave to the reading and they will compare it with their classmates' order. They will discuss the orders and negotiate whether their orders are similar or not.	among students. (Students can share their information in Spanish) All Students will know the general idea of the whole reading after listening to their classmates in their group.	15 minutes
Step 3	Students will find out the correct sequence of the story and they will read the whole reading in their groups and demonstrate comprehension of it by answering questions such as: *Who was/were the main character (s)?* *What was the main idea of the reading?* *What was the purpose of the author?* These questions will be written on the board.	All Students will strive to demonstrate comprehension of the passage by answering the questions.	10 minutes
Step 4	Students will take a multiple choice test in order to demonstrate their comprehension. The test is to be done individually.	Multiple choice test similar to the *"Pruebas Saber 11"*.	10 minutes

PROCEDURE			
Activity	**Description**	**Assessment**	**Time**
Pre-Reading	Introduce the topic of the reading by making the students infer the content of it orally.	Teacher's diagnosis about the Students' knowledge of the topic.	5 minutes
Step 1	Each student in the classroom will be given a reading divided into two parts. The reading will be the same for all the students. The students will read the pieces of papers and they will organize the sequence of it. • Level of difficulty 1 (reading divided into two parts)	The teacher will monitor the students' performance during the reading.	15 minutes
	When the students have finished the individual reading, they will raise their hands to take note of time per student. The teacher will write some questions in the board. The students will discuss those questions in the next step.		
Step 2	Students will form groups of four members. They	Participation and collaboration	

Appendix B

Pre-test/Post-test

"THE EFFECT OF JIGSAW AS A COOPERATIVE LANGUAGE TECHNIQUE ON STUDENTS' READING COMPREHENSION"
I.E.M CIUDADELA DE PASTO – 11º GRADE

COMPRENSION DE TEXTOS

En esta parte de la prueba se formulan varias preguntas a partir de un texto. Usted debe leer cuidadosamente el texto y elegir la opción que corresponda a la pregunta formulada.

S.A.F.E. (Stop All-Fur Wearing Everywhere) is an American Organization whose intent is to make people conscious of the cruelty of wearing fur. Around the country, thousands of people have turned in their fur hat, jackets, stoles and coats to S.A.F.E. offices. Locally, we have received twelve fur items so far.

On August 28, there will be nationwide fur-burying ceremonies by S.A.F.E. members. Ours will be at the Nordstrom Farm at 11 AM. After we have buried the furs, we will plant trees on the site as a memorial for the animals that died for vanity and fashion.

1. An adequate definition for the underlined word fur would be

   A. The hard, outer covering of some animals.
   B. The flexible, outer covering of a human or animal body.
   C. The thick, hairy outer layer of some animal.
   D. The natural, outer layer which covers a person or an animal.

2. The underlined sentence thousands of people have turned in their fur hats, jackets, stoles and coasts to S.A.F.E. office, suggests that:

   A. People reject S.A.F.E.'s claim.
   B. People didn't care about S.A.F.E.'s invitation.
   C. People didn't answer S.A.F.E.'s demand.
   D. People responded to S.A.F.E.'s request.

3. The intention of the author of this article would be:

   A. To promote fur-wearing in the E.U
   B. To invite people to the fur-burying ceremony.
   C. To inform people about the event that rejects fur wearing.
   D. To persuade people about the negative aspects of fur wearing.

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I.E.M CIUDADELA DE PASTO – 11º GRADE

Breaking the Ice

Michael Sharp visits an outdoor pool

It's just before 7 a.m. and I'm at an outdoor swimming pool in London, where the temperature of the water is only 11 degrees above freezing! Amazingly, there are already eight people swimming.

I had intended to discover, by taking a swim myself, why anyone would want to swim in such cold water. However, in the end, I decided to ask people instead. Peter Smith has been a swimmer here for three years, coming every morning before work. 'It's wonderful on a cold winter morning,' he says. 'I thought it would make me healthier and I haven't been ill once since I started.'

All the swimmers here say the same thing. They all feel fitter. However, not everyone agrees with them. Some doctors say it helps fight illness, while others say it could be dangerous, especially for your heart.

I asked Peter what they did on the days when the pool was frozen. 'That's easy,' he said. 'There's a place in the middle where the ice is thin and easy to break. You have to avoid the sides where the ice is thicker. I did try to swim there once just to see what it was like, but I found that it was impossible to break through the ice.'

I would like to be able to say that I too dived happily into the water and swam a couple of hundred meters. But the truth is, fearing the worst, I walked very carefully into the pool, stood there almost in shock and then got out again after 30 seconds before I became a block of ice!

4. What is the writer trying to do in this text?

   A. explain why some people like swimming in the cold
   B. prove an idea he has had about keeping fit
   C. warn people not to go swimming in cold water
   D. advise people on ways to stay healthy

5. What can a reader understand from this text?

   A. where to go swimming in London
   B. what happened to the writer at the pool
   C. how to keep warm in cold water
   D. how often the writer goes swimming

6. What does Peter Smith say about his morning swim?

   A. It has helped him recover from a recent illness.
   B. He enjoys it when the pool is covered in ice.
   C. It is the reason why he keeps well all year.
   D. He thinks it makes him work better.

"THE EFFECT OF JIGSAW AS A COOPERATIVE LANGUAGE TECHNIQUE ON STUDENTS' READING COMPREHENSION"
I.E.M CIUDADELA DE PASTO – 11º GRADE

7. What did the writer feel about swimming at the pool?

   A. It was as cold as he expected.
   B. He did not like the ice.
   C. It made him feel healthier.
   D. He enjoyed swimming up and down.

Jumping across cities

Forget about expensive gyms, the new sport in cities is free running. Since it started in a Paris suburb in the 1990s, free running was attracted lots of fans in cities around the world. Instead of walking normally, free-runners jump over or around anything – cars, buildings, trees, or streetlights in their way.

One of the sport's inventors told our reporter how free-running started. It was boring where we lived; there was nothing for us to do after school. We had done playground games like football and basketball when we were kids but we wanted something new and exciting. We started learning how to jump and run between buildings – and we loved it. Walking is a waste of time. Free-runners have to use their imaginations. Everything – a tree, a streetlight – is a part of our outdoor gym. We're like children because we've never stopped playing in the streets.

The sport's website has lots of rules, for example, don't break people's windows, don't jump on flowerbeds and don't be rude to people who want you to stop. Safety is also very important. You must start with the easy moves – you have to do thousands of small practice jumps before you try anything difficult. If you made only one mistake, you might hurt yourself badly.

A local person said "It's good that young people have something to do". But when they jump off buildings like cats they sometimes frighten other people.

8. According to the text,

   A. free-running can be practiced by children, young people and fans of the sport.
   B. free-running is a risky sport.
   C. Free-running can be practiced without any regulation.
   D. Free-running is the safest sport in the world.

9. A conclusion for this text could be,

   A. Everyone can practice this sport.
   B. Only those who can pay for the equipment can practice this sport.
   C. Free-running is a new exciting sport for young people.
   D. Free-runners want to frighten people.

10. According to one of the sport's inventors we can state that free-running was created because,

"THE EFFECT OF JIGSAW AS A COOPERATIVE LANGUAGE TECHNIQUE ON STUDENTS' READING COMPREHENSION"
I.E.M CIUDADELA DE PASTO – 11º GRADE

A. There were many activities to practice but kids were lazy.
B. With this new sport the creators earned a lot of money.
C. Young people wanted to imitate cats.
D. The activities before free-running were boring.

11. According to the context, this reading can be found in,

A. An encyclopedia entry
B. A newspaper article
C. An ecology bulletin
D. A fashion magazine.

12. Why would someone read this article

A. To find out the importance of sport.
B. To understand why young people frighten people
C. To decide why children should start to practice free-running.
D. To learn about this new sport.

"THE EFFECT OF JIGSAW AS A COOPERATIVE LANGUAGE TECHNIQUE ON STUDENTS' READING COMPREHENSION"
I.E.M CIUDADELA DE PASTO – 11º GRADE

ORGANIZACION DE ORACIONES

A continuación se presentará un enunciado y varias oraciones numeradas las cuales deben ser organizadas para construir un párrafo lógico y coherente. Usted debe leer cuidadosamente para determinar la secuencia correcta y elegir una de las opciones.

13. Amy Johnson is from England and she is known for being the first woman pilot to fly to Australia.

    1. and she became the first woman pilot to fly to Australia.
    2. when she was still a school girl.
    3. There, she was taught how to service planes
    4. Amy Johnson joined the London Aeroplane Club

    A. 3,2,4,1
    B. 2,4,1,3
    C. 4,2,3,1
    D. 4,1,2,3

14. London was the world's biggest city at the time of World War II but now it isn't.

    1. but now there are many cities
    2. From about 1800 until World War II,
    3. London was the biggest city in the world,
    4. which are much bigger.

    A. 2,1,4,3
    B. 2,3,1,4
    C. 3,2,1,4
    D. 3,1,2,4

15. Some of the words we use today come from the names of people who lived in the past.

    1. that is done to remove a baby from its mother's womb.
    2. The name comes from the name of the Roman Emperor Julius Caesar,
    3. who was reputedly born this way.
    4. A Cesarean section is a surgical operation

    A. 2,3,4,1
    B. 4,1,2,3
    C. 2,1,4,3
    D. 4,3,2,1

Appendix C

Reading 1

The Early Bird catches the worm "maybe"

Bud is a bird. He wakes up early to catch a worm. Bud is very hungry. Will is a worm. He moves around in the dirt. Will sees Bud flying in the sky. Bud is looking for food. "I must hide," says Will. Will moves to the grass.

He still sees Bud flying in the sky. "I am not safe here. I must hide somewhere else." Will moves near a tree? He hides in the shade. Bud flies around the tree. "The shade does not hide me!" Will moves to the garden. He still sees Bud flying in the sky. "I must find some place safe to hide," Will says. Will looks around and disappears as Bud swoops down.

Bud eats some bird seeds that he finds on the ground. Bud did not see Will. Bud flies away as Will pokes his head out of an apple that fell from the tree! Will smiles and says, "That was close!"

Appendix D

Reading 5

Animal Migration

Have you ever noticed that we only see certain animals in certain seasons? Many animals move from one area to another at different times during the year. This movement is called migration. Animals migrate for different reasons. Some, like the manatee and the Ruby-Throated Hummingbird, migrate to stay warm in the winter. Some animals migrate for food, water, and protection. Caribou move south each winter to evergreen forests. The forests protect them from the cold winds and provide a better food supply.

Other animals, like the Emperor Penguin, migrate for their children. These penguins choose the coldest time of year and the coldest place on the planet- Antarctica- to raise their young. They migrate inland, away from the sea, so they are far away from predators when their eggs hatch. These journeys are often thousands of miles.

It's amazing that so many animals are able to find their way back to the very same places in the world year after year. Loggerhead Turtles travel thousands of miles to lay their eggs on the very same beach where they were hatched themselves. Monarch butterflies often end up migrating thousands of miles to the very same tree that their ancestors roosted in generations before.

California Gray Whales have the longest migration journey of any mammal. They travel 10,000-14,000 miles round trip each year. We know the many reasons why animals migrate, but no one really knows how they find their way. They do not have a map, compass or GPS to guide them. Maybe you will become the famous scientist that solves the mystery of animal migration.

Appendix E

Reading 9

The Stolen Kidneys

Jennifer and Amanda were very good friends. Now they are in college. Jennifer was the smart, intelligent one. Amanda was the fun-loving, happy girl.
One night, Amanda was chatting on the Internet while Jennifer did her calculus homework. Amanda was singing along with her head phones, and annoying Jennifer a little.
"Shut up, Amanda. You're being annoying," Jennifer shouted.
"What's your problem?" Amanda asked, defensively.
"Nothing. Just... turn the volume down. Okay?"
"Ok, no problem," Amanda replied.

Jennifer continued doing her homework, as Amanda chatted. Suddenly, Amanda said with emotion.
"Guess what, Jennifer!"
Jennifer sighed. "What?"
"David wants to meet me tomorrow night!"
"Um, who?"
"You know my internet boyfriend?" Amanda said impatiently.
"Um. Great," replied Jennifer. Amanda, a little angry by her friend's lack of enthusiasm, signed off the Internet and decided to go to bed.
"Good Night, Jennifer."
"Mmm," replied Jennifer.

The next night, as planned, Amanda went out to meet David at a local bar called "McGrundy's." They had an excellent night together, and it was getting very late.
"One more drink?" David asked.
"Sure. Why not?" Amanda replied, even though she was getting a little drunk. David ordered Amanda another drink, and gave it to her. She drank it completely, and David paid. They left.

The next morning, Jennifer woke to hear crying in the bathroom. She really wasn't ready to wake up, as Amanda and her new boyfriend had come in late and woken her up. They'd been making a lot of noise in the bathroom, too. Jennifer was upset, got up, and walked into the bathroom.

"Amanda? What the hell?" Amanda was asleep in a bathtub full of ice cubes. Jennifer was extremely confused. She looked around the bathroom and saw a note on the mirror. It said: Call 911 if you want to live. Jennifer thought it was a joke, move Amanda to try to wake her. She wouldn't wake up. Jennifer called 911. Paramedics arrived at their apartment and took Amanda out of the tub, naked. They put her on her stomach and, as they suspected -- Amanda's kidneys had been stolen.

Appendix F

Reading 11

The mystery of the Maya

The Mayan Indians lived in Mexico for thousands of years before the Spanish arrived in the 1500s. The Maya were an intelligent, culturally rich people whose achievements were many. They had farms, beautiful palaces, and cities with many buildings. The Mayan people knew a lot about nature and the world around them. This knowledge helped them to live a better life than most people of that time, because they could use it to make their lives more comfortable and rewarding. Knowledge about tools and farming, for instance, made their work easier and more productive.

In ancient Mexico there were many small clearings in the forest. In each clearing was a village with fields of corn, beans, and other crops around it. To clear the land for farms, the Maya cut down trees with stone axes. They planted seeds by digging holes in the ground with pointed sticks. A farmer was able to grow crops that produced food for several people. But not every Maya had to be a farmer. Some were cloth makers, builders, or priests.

The Maya believed in many gods, including rain gods, sun gods, and corn gods. The people built large temples to honour the Mayan gods. Skilful workers built cities around these temples. It was difficult for them to construct these cities, because they had no horses to carry the heavy stone they used to build with. Workers had to carry all of the building materials themselves. Today, many of these ancient Mayan cities and temples are still standing.

Although the cities that the Maya built were beautiful, and the people worked hard to build them, very few of the people lived in them. Usually, only the priests lived in the cities.

The other people lived in small villages in the forests. Their houses were much simpler than the elaborate structures in the cities. They lived in small huts with no windows. The walls were made of poles covered with dried mud, and the roof was made of grass or leaves. Most Maya lived a simple life close to nature.

Measuring time was important to the Maya, so they developed a system for measuring it accurately. Farmers needed to know when to plant and harvest their crops. Mayan priests made a system to keep track of time. They wrote numbers as dots (...) and bars (-). A dot was one and a bar was five.

The Mayan priests studied the Sun, Moon, stars, and planets. They made a calendar from what they learned. The year was divided into 18 months of 20 days each with five days left over. The Mayan calendar was far more accurate than the European calendars of the time.

Around the year 800, the Maya left their villages and beautiful cities, never to return. No one knows why this happened. They may have died from an infectious disease. They may have left because the soil could no longer grow crops. Archaeologists are still trying to find the lost secrets of the Maya. They are still one of our greatest mysteries.

Appendix G

Reading Test 5

"THE EFFECT OF JIGSAW AS A COOPERATIVE LANGUAGE TECHNIQUE ON STUDENTS' READING COMPREHENSION"
I.E.M CIUDADELA DE PASTO – 11º GRADE

READING TEST 5
ANIMAL MIGRATION

Name:_____

1. What is migration?

a. animals sleeping through the winter
b. animals preparing to hatch eggs
c. animals traveling long distances
d. animals getting lost

2. Where do Emperor Penguins go when they migrate?

a. inland, near the North Pole
b. towards the sea, near the North Pole
c. inland, near the South Pole
d. towards the sea, near the South Pole

3. What information about animal migration is not known?

a. where the animals migrate to
b. why animals migrate
c. which species of animals migrate
d. how animals find their way when they migrate

4. What is the author trying to do in this text?

a. To describe the migration of mammals
b. To explain the influence of seasons on the animals' migration.
c. To describe animal behavior
d. To describe the ability of animals to get lost when migrating.

5. A possible conclusion for this text would be:

a. Although we know that animals migrate, we don't know how they guide themselves.
b. Although animals know when to move, they get lost in their way.
c. Although we don´t know why the animals move, we know when they start moving.
d. Although animals move all year, they don't increase their chance of survival.

Appendix H

Survey Sample

"THE EFFECT OF JIGSAW AS A COOPERATIVE LANGUAGE TECHNIQUE ON STUDENTS' READING COMPREHENSION"
I.E.M CIUDADELA DE PASTO – 11º GRADE

ENCUESTA

1= Nada

2= Casi Nada

3 = Poco

4= Mucho

5= Completamente

1. En qué medida cree usted que mejoro su comprensión lectora con la técnica aplicada en clase.

   a.) 1 b.) 2 c.) 3 d.) 4 e.) 5

2. En qué medida le gusto la forma de abordar la lectura con la técnica realizada en clases.

   a.) 1 b.) 2 c.) 3 d.) 4 e.) 5

3. En qué medida cree usted que el test al final de cada lectura es conveniente para su aprendizaje.

   a.) 1 b.) 2 c.) 3 d.) 4 e.) 5

4. En qué medida cree usted que esta técnica de lectura favorece su preparación a las Pruebas Saber 11.

   a.) 1 b.) 2 c.) 3 d.) 4 e.) 5

5. En qué medida le parece conveniente la presentación del material de la lectura.

   a.) 1 b.) 2 c.) 3 d.) 4 e.) 5