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Original Paper

Can Chilean Engineering Students Increase Their English As Foreign Language Reading Comprehension Skills By Using Interactive Graphical Organisers – Igo - Strategies?[1]

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Abstract

This research study reports the effects of using interactive graphical and technological strategies - IGOs in the reading comprehension process of EFL Chilean students. Reading is an essential skill for EFL learners. Consequently, helping students to develop strategies to improve their level of reading comprehension becomes vital. This quasi-experimental study reports the findings on the impact of IGOs used to teach EFL reading comprehension skills to a group of Chilean engineering students. The IGOs strategies: cause and effect and advantages and disadvantages were tested. The information collected in the pre-test and post-test showed that the experimental group increased their performance compared to the control group. Thus, by using IGOs Chilean engineering learners enhanced the level of EFL reading comprehension skills.

Keywords: graphic organiser, reading comprehension, reading strategies, English as a Foreign language, Chilean students.

Introduction

Doubtless reading is a crucial ability for EFL (English as Foreign Language) learners. Moreover, "effective reading is essential for success in acquiring a second language. After all, reading is the basis of instruction in all aspects of language learning" (Mikulecky, 2008, p.1). Therefore, developing strategies to help students improve their level of EFL reading comprehension becomes paramount, above all when statistics indicate that only two percent of adult people in Chile can communicate clearly in English, suggesting that there is a huge necessity to teach Chileans those strategies (Reportajes 24, 2016). Moreover, the data taken from Editor (2016) about Chilean English proficiency informed that according to EF Education First, the efforts in Chile to promote its proficiency have not been as expected. In 2011 Chile ranked 36 of 44 nations, with "very low" proficiency levels. After, in 2012 and 2013 Chile ranked up to 38 of 52, then 44 of 60. Nevertheless, in 2014 Chile went down 41 of 63, in 2015 ranked down 36 of 70, and in 2021 registered its worst falling to 47 of 123 countries. Thus, Chilean English proficiency level remains low.

In order to shorten that huge gap, it is necessary to provide students with clear input and strategies. There are two receptive skills when learning a foreign language, reading and listening. The reading receptive skill is the input proposed to work on this research study. Masduqi (2016) states that "often in the process of learning new language, learners begin with receptive understanding of the new items, then later move on to productive use" (p.508). Therefore, the skill of this research study is reading comprehension. Moreover, as the strategy (IGOs - interactive, graphical, and technological strategies) used does not have audios, it is not possible to evaluate the listening receptive skill.

[1] This quantitative article came up from a master's thesis which was submitted as a final requirement for the Master's program in Linguistics called "A study on the effects of the use of Interactive Graphical and technological strategies software in the reading comprehension process of a group of engineering students in the context of English as a Foreign Language classroom" (April, 2013).

Besides, as Hernández-Chérrez et.al (2020) explain "low reading comprehension may seem to be linked to the lack of reading strategies" (p. 111). Hence, it is important to research on this issue in order to help Chilean students to improve their deficient EFL reading comprehension skills.

This research study aimed to analyse and report the use of the software called IGOs (interactive, graphical, and technological strategies) as a strategy to enhance EFL reading comprehension skills of a group of university students from an Engineering Faculty. Specifically, skills related to organise and analyse an English text.

An IGO is "a combination of non-linguistic representations (shapes, symbols, and arrows) with linguist elements (words and phrases). Interactive graphic organizers facilitate the discovery and design of patterns, relationships, and interrelationships, as well as helping to develop creative thinking" (López et al., 2010, p. 67). Hernández-Chérrez et al. (2020) add that Graphic Organizers are part of the category called Graphic Strategies (p. 110).

When learning English Language, graphic organisers give students the opportunity to classify, understand and apply information clearly. They can be used before, during, and after reading (Gallavan and Kottler, 2007, p. 117). Therefore, this type or graphical strategy was chosen among others available to teach English language.

This study worked with this software called IGOs in order to analyse the possibility of showing a better input to help EFL students when reading English language texts. The analysed question was: Can Chilean engineering students increase their EFL reading comprehension skills by using IGOs strategies?

It was a quasi-experimental study that reported the research project results on the impact of IGOs on teaching EFL reading comprehension skills to a group of university students. The information was collected from a pre-test and a post-test. The experimental group used the IGOs strategy and the control group the traditional strategy.

Theoretical Framework

Reading Comprehension Strategies and Models

As Grabe and Yamashita (2022) argue in their book about reading in a second language that "Reading is something many of us take for granted" (p. 5), adding that people read effortlessly and almost unplanned.

Grabe (2009) explains that reading is defined as a complex mixture of processes, i.e., reading is a rapid, efficient, comprehending, interactive, strategic, flexible, purposeful, evaluative, learning and linguistic process; where the building blocks of fluency and comprehension are the main component skills in order to build reading comprehension. The lower-level processes help to understand the fluent reading process. They include word recognition, using grammatical information, and building meaning through clause level from these two components. These processes are fulfilled as part of working memory which is the framework in which knowledge resources and cognitive processing integrate the reader's comprehension. The higher-level processes take for granted that the reader directs attentional resources to these component skills. Many aspects of these higher-level components can carry out a mode automatically, except when problems arise. An important ability is a set of reading skills and resources under the order of the mechanism of controlling placed in working memory where strategies, goals, inferences, background knowledge, and comprehension monitoring occur. The implications for Spanish speakers are a double task, because they not only need to carry out those processes, they also have to know the meaning of the foreign words and how they are placed differently in the text (p.14).

Barraza (2014) explains that "reading is a crucial skill for students of ESL (English as a Second Language) and EFL, and because many students believe that reading is the most essential skill" (p.30). This Chilean research study showed the importance of EFL reading comprehension and how Chilean students not only improved scores by using strategies but also enjoyed the process.

Although, reading comprehension is considered a complicated cognitive process since it encompasses several levels of comprehension, word, sentence, and paragraph (Spratt et al., 2005, p. 21). Hence, EFL

teachers and professors should find a way to help students improve their reading skills. One available option could be using graphic organizers (GOs).

Gamboa (2017) states that "many years ago reading in English as a foreign language was perceived as a passive process" (p.162). It is explained that the process was decoding information in order to reconstruct and recognize what the author was trying to communicate, but there were reading problems related to the decoding process. Therefore, it is essential to help students how to read a second or foreign language text through the development of skills, specifically, reading comprehension skills.

Saville-Troike (2006) proposes a categorization of the skills concerning learning a second or foreign language (p. 137). In a written and oral mode, two receptive (input) skills and two productive (output) skills. Table N°1 shows those skills.

Table 1. Language Skills

Mode	*Receptive*	*Productive*
Written	Reading	Writing
Oral	Listening	Speaking

Note: List adapted from Saville-Troike (2006, p. 137).

Furthermore, the literature shows many issues concerning L2 reading comprehension. For example, Grabe (2009) contends that "second language reading involves two languages. The dual-language involvement implies continual interactions between the two languages as well as incessant adjustments in accommodating the disparate demands each language imposes" (p.148-149).

In relation to reading, the models top-down, bottom-up have been discussed for decades. Bottom-up models describe reading as a mechanical process, where the readers decode the text letter by letter, word by word, and sentence by sentence. In contrast, in top-down models, the readers control the comprehension process by means of expectations, strategic processing, and objectives, directing the eyes to find relevant information (Grabe and Yamashita, 2022, p.130).

Grabe and Yamashita (2022) agree that in L2 reading studies, only one general descriptive model of reading has been postulated, Bernhardt's model in 1991 and 2010 (p. 140). However, it is not clear when explaining specific component abilities and the implications for the development of reading.

In relation to reading comprehension strategies, a strategy is defined as an adjustable process, a rules' group that looks for an optimal decision in every moment. In Spanish: un proceso regulable, conjunto de las reglas que buscan una decisión óptima en cada momento. (Real Academia Española, 2014, definition 3).

Beyer (1987) proposed an inventory of reading comprehension strategies as key components (p. 27). Some of them are listed in Table N°2.

Table 2. Inventory of reading comprehension strategies

In order to organise, students have to:	*In order to analyse, students have to:*
▪ Order a sequence of events. ▪ Compare if there are pros and cons (advantages and disadvantages)	▪ State causes and effects (identify a problem and solutions)

Some metacognitive operations, i.e. awareness, understanding, and self-regulation of thought processes, students should have when dealing with a text in English are displayed in Table N°3. (Beyer, 1987, p. 27)

Table 3. Beyer's metacognitive operations

Planning	*Monitoring*	*Assessing*
For example, they use or do not a dictionary, they select a strategy to follow and get the meaning of the text.	They realise about own mistakes and are able to overcome them.	They assess their own process

As Grabe (2009) states, the key to a fluent reader is an effective reading strategy either L1 or L2. However, there is a different starting point for L2 reading strategies, since they involve topics that are not included in L1, such as mental translations, L1 transfer, and the metacognitive advantage of L2 readers (p.136).

Grabe and Yamashita (2022) affirm that "the notion that effective reading strategy use is a hallmark of the good reader is now widely accepted among both L1 and L2 reading researchers" (p. 300). Founded mainly on L1 research about strategies during the last decades, specific comprehension strategies have been supported. There are ten strategies that have been explored to enhance comprehension. They are listed in the Table N°4.

Table 4. Effective reading comprehension strategies

Effective reading comprehension strategies
1. Previewing (e.g. pictures, titles, headings)
2. Activating prior knowledge
3. Predicting
4. Forming questions (self-interrogation)
5. Answering questions about the text
6. Summarizing
7. Monitoring comprehension
8. Using text structure awareness and graphic organizers
9. Visualizing and making mental representations
10. Generating appropriate inferences

Note: Taken from Grabe and Yamashita (2022, p.301).

Graphic Organisers

Concerning graphic organisers, specifically on the reading comprehension strategy number eight from Table 4, Grabe (2009) points out that as a strategy to organise information, they can improve recall of information and a better comprehension of students (p.258).

Grabe and Yamashita (2022) add that "as a strategy modeled for learners and then practiced by learners, the use of graphic representations to organize text information leads to improve memory of information and significantly better comprehension" (p.306). In L2, graphic organizers demonstrate to help students when learning text structure, main concepts, and their relations.

Tang (1992) reports an experiment designed to find out the effect of graphic representation of knowledge structures on the comprehension of ESL reading. The results informed the use of graphical representations as an aid to teach reading in the English language.

Mohammadi et al. (2010) affirms that for learners of ESL or EFL with little prior knowledge, instructional strategies have to be incorporated into the course material. One of the most central ways of integrating new information into the existing knowledge structure of a learner is using an advanced organiser. An advanced organizer could be a chart or image that help students understand concepts using the knowledge they have learned before (p. 4668). According to Gallavan and Kottler (2007) graphic organisers are visual models that give the opportunity to both teacher and students to use these tools in order to classify, comprehend, and apply information to achieve an outcome. They can be used before, during, and after reading. Regarding the learning purposes they can be organized into eight categories: assume and anticipate, position and pattern, group and organise, compare and contrast, relate and reason, identify and imagine, estimate and evaluate, and combine and create (p. 117).

Wong (2019) searches "the possibility of the usage of graphic organizers in an EFL class and its effects on students' reading comprehension" (p. 73). The conclusions state that there is not enough evidence of the GOs benefits in an EFL context. However, it is also added that incorporating GOs in an English as a Foreign Language course could offer an effective tool to teach students.

Using graphic organizers can improve the levels of students reading comprehension (Hernández-Chérrez et al., 2020, p. 115). This study reports that when using graphic organizers, learners can identify important information from a text and improve other skills related to communicative or analysis aspects, fostering their performance, concluding that graphic organizers strengthen the reading comprehension of texts.

In an investigation carried out by Jiang (2012) with university EFL students, the use of GOs showed a significant improvement in the way students comprehend and process English texts (p. 96).

Jiang and Grabe (2007) explain that one recent consistent recommendation for raising awareness of text structure with English for Academic Purpose (EAP) students has been the use of graphic strategies, in this case, through the use of Graphic Organisers (GOs). They also believe that GOs are supposed to be mainly valuable because good graphic representations can give you an idea about the key parts of a whole and their relationships. Thus, they allow a holistic understanding that words by themselves cannot express. However, some studies on GOs have produced incongruent findings and have questioned the effectiveness of GOs in reading instruction. A second concern is related to the various understandings of what a GO is and how it is designed for research or instructional purposes (p. 47).

On the other hand, some concerns about claims for the effectiveness of GOs are described by Jiang and Grabe (2007) involving inconsistent research results on student improvements, the limitation in generalizability (word coined by those authors) from research studies, and the need for research studies with second language (L2) students and with more extended instructional exposure time (p.35).

Moreover, Grabe (2009) inform that "students comprehend texts better when they see how text information is organized (along with the linguistics clues that signal this organization). However, there are many types of graphic options for students to work with and "it is not clear how well various types of graphic organizers work to improve text structure knowledge or comprehension abilities over time". A useful idea could be the use of a graphic organizer that shows the structure of a text in an explicit way. Instruction using graphic organizers to raise structure awareness could be a useful tool. Although, this kind of instruction encompasses specific teachers and professors' demands since class materials do not contain graphic organizers (p. 257-258).

Examples of basic GOs proposed by Grabe and Yamashita (2022) are displayed in the Figures N°1 and N°2.

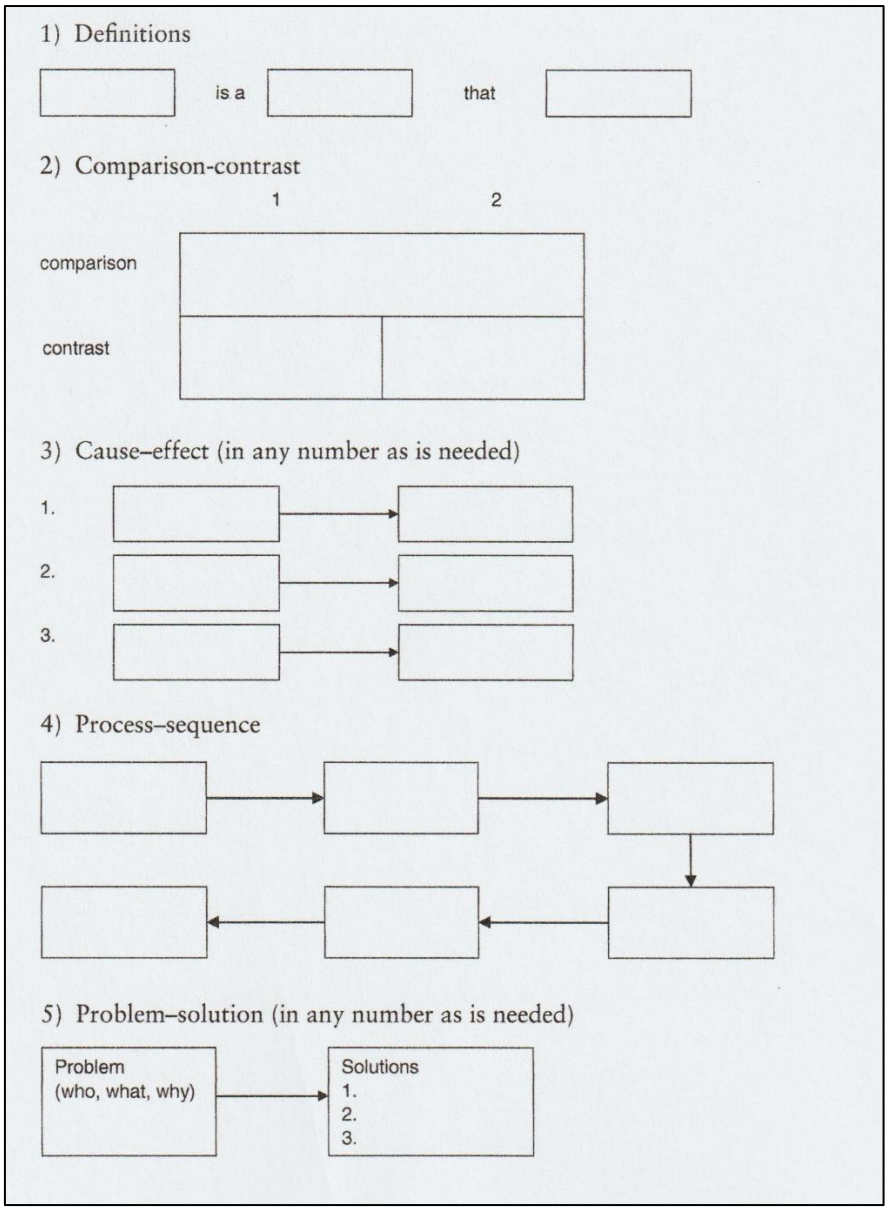


Figure 1. Examples of Basic GO forms

Note: Taken from Grabe and Yamashita (2022, p. 363).

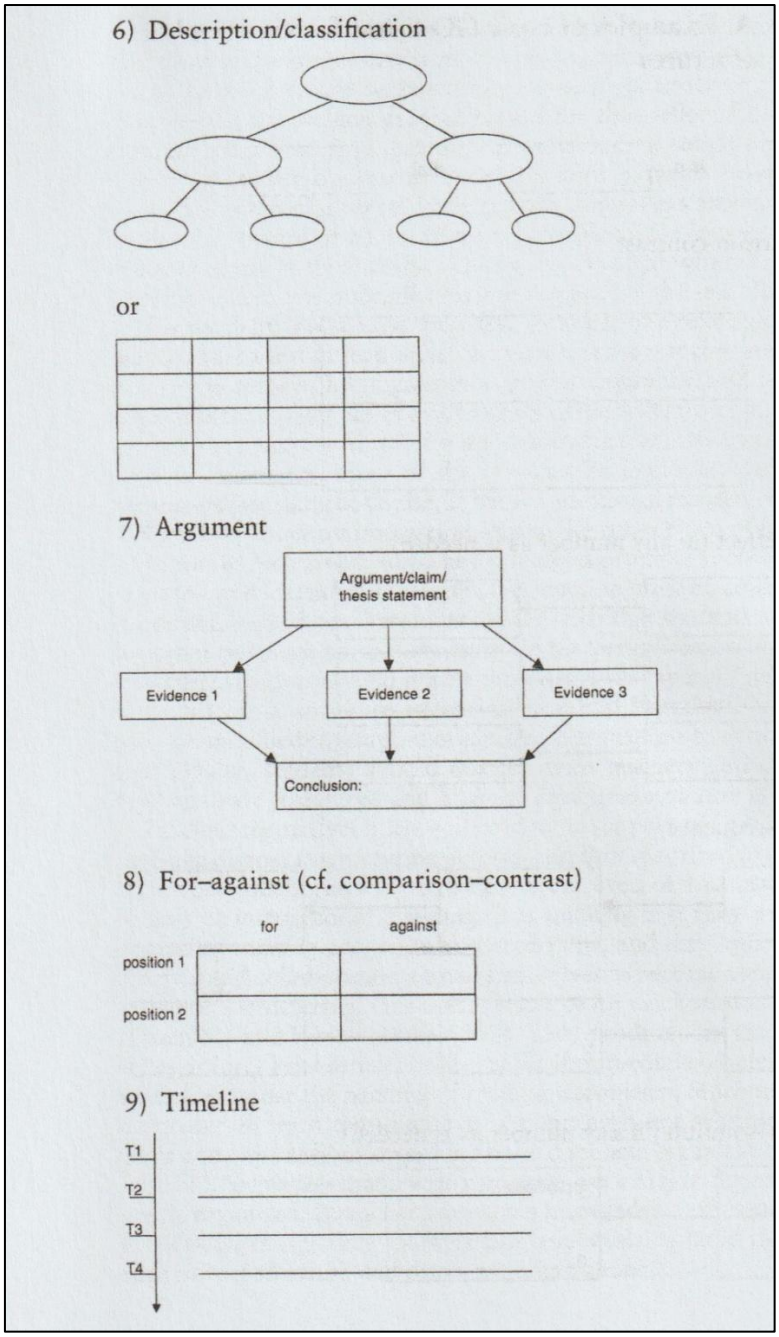


Figure 2. Examples of Basic GO forms

Note: Taken from Grabe and Yamashita (2022, p. 364).

Proficient readers identify and use lexical forms to identify organizational patterns, for example, comparison and contrast, and cause and effect. They also identify words that show main ideas and details, among other forms. Research on effective evidence on the use of graphic organizers when teaching explicit organizational patterns and structure awareness (Grabe and Yamashita, 2022, p. 362).

Regarding learning purposes, graphic organisers can be organized into eight categories (Gallavan and Kottler, 2007, p. 118-119). These categories are listed as follows:

1. assume and anticipate

2. position and pattern
3. group and organise
4. compare and contrast
5. relate and reason
6. identify and imagine
7. estimate and evaluate
8. combine and create

This research study focuses on categories number two (position and pattern) and number three (group and organise). Its intention is to show a sequence, order, or causes and effects. Some words associated to this organiser are: after, before, cause, chain, effect, first, following, last, next, organize, position, place, prior, set, sooner, subsequent.

GOs can be divided into another group called Interactive Graphic Organisers (IGOs), a new reading strategies' software that can be used to increase students' learning.

Interactive Graphic Organisers (IGOs) are new technological tools generated by computers to improve students' learning. They were created by a group of researchers at the University of Santiago of Chile. Their objective is to improve learners' skills and capacities.

Two examples of this software are shown in the next figures:

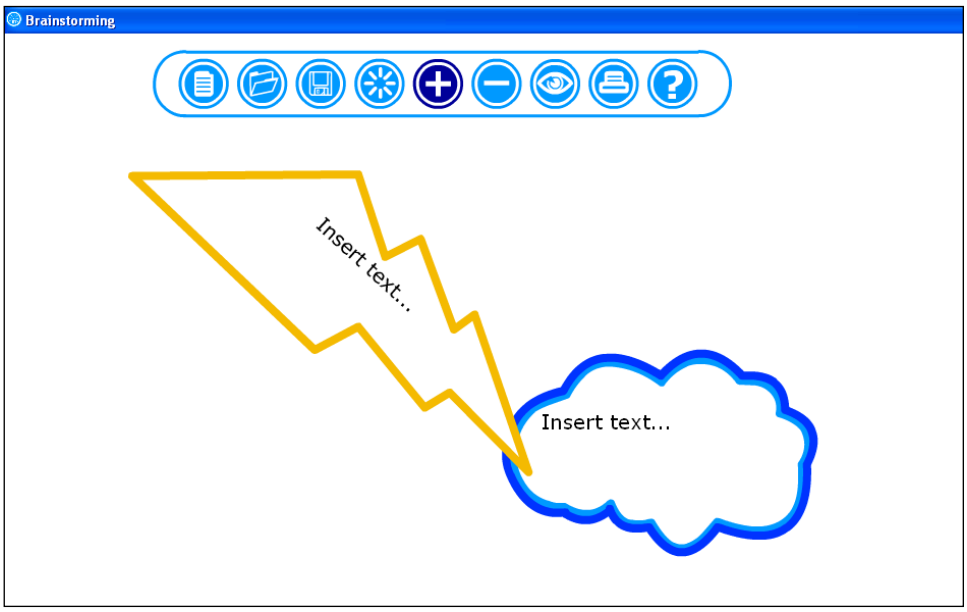


Figure 3. Brainstorming IGO

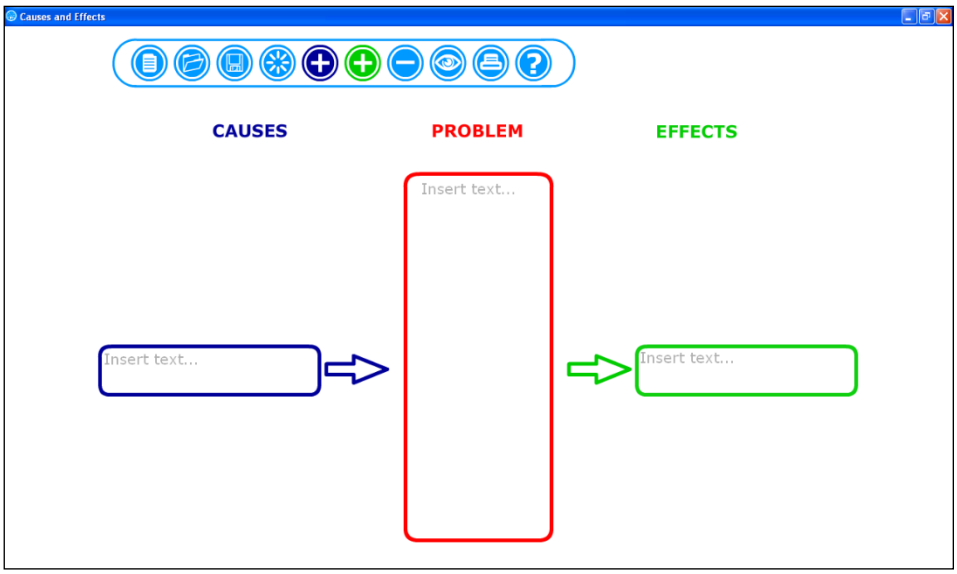


Figure 4. Cause and effect IGO

A study performed in Chile that supports the use of this type of IGOs for teaching reading comprehension showed that the learners' skills can significantly improve, thus, IGOs can be used as a methodological resource in order to help students develop their reading skills (Ponce et al., 2012, p. 9).

Another important issue is to investigate about the use of GOs in different CEFR levels in order to confirm that it is a useful tool no matter the level of English the student has. One recent study probed that the use of reading strategies, graphic organisers, helped to get better scores to a group of B1-B2 students (Axrorova, 2025, p.49).

Concerning theories, Guo et al. (2020) inform that the Dual Coding Theory (DCT) "has frequently been used to justify including graphics with the text". Adults and young students have been investigated using DCT showing that both could benefit from the use of graphical representations (p.3).

The Dual Coding Theory was postulated by Sadoski & Paivio in 1994. It is a well-known theory of general cognition. Originally, the DCT was developed to describe verbal and nonverbal impacts on memory. However, it has been extended to numerous areas of cognition, such as reading, defined as a cognitive act. As in other cognitive acts, we perceive, comprehend, recognize, appreciate, interpret, and remember information that is not in text type, same for information that is in text type (p. 2).

Some basic assumptions that help to understand this theory are (a) that its basic principle is that all mental representations hold a number of concrete qualities of the external experiences from which they originate, linguistic or nonlinguistic experiences, of which differing features develop into two separate mental systems, the verbal code (for representing and processing language) and the nonverbal code or imagery system (for processing non-linguistic objects and events). Each system has its own units and an organization in a hierarchical form. Both account for knowledge of language and knowledge of the world; (b) there are basic units called "building blocks" of cognition. (Sadoski and Paivio, 1994, p. 3).

According to Grabe (2009) the Dual Coding Theory (DCT) has elaborated a model of reading that combines both verbal and visual processing. "Verbal information from reading is processed as a growing network of activated concepts, and this network of associations triggers visual representations that provide conceptual mental representations of the information" (p. 100).

Advantages and disadvantages can be found in this model. Among the reading models, DCT is unique because the interaction between verbal and visual text helps to link visual imagery and reading comprehension. Moreover, the interaction between verbal and visual input enhances the learner's comprehension abilities. Nevertheless, "the learning of abstract concepts is not easily specified, nor is the process of generalization and categorization clearly explained" (Grabe, 2009, p.101).

On the contrary, the traditional strategies teachers used with EFL students have involved the use of a whiteboard and as Exley and Dennick (2007) argue, the teacher becomes the centre of the learning process. The educator holds the lessons in an expository way, in consequence, the students do not participate actively to construct their own knowledge (p. 107).

Regarding English language university instruction in Chile, there is not many studies to mention. However, one of the few studies carried out in Chile found out the English learning strategies commonly used by effective engineering students with the aim of that trainers could encourage the use of those strategies among less effective engineering students (Del Castillo and Sessarego, 2013). This study concluded that cognitive strategies that range from repeating, analyzing expressions, to summarizing were used by successful students who perform those strategies out of the classroom, enjoy reading in English, imitate L1 speakers and relate knowledge of L1 with L2. Although it can be generalised, this study supported the use of strategies to help students when learning EFL at university (p. 35).

Reading and Technology

In relation to reading and technology, as Grabe (2009) argues, it is a rapid area of expansion and complexity. Three main issues to consider are: (a) the role of the computer in assisting reading instruction, (b) the growth of electronic and multimedia texts and how they are read and comprehended, and (c) the value of reading instruction using technology (p. 383).

There has been a small positive effect in the studies carried out on computer assisted instruction, "only minimal evidence that technology assisted reading instruction significantly improves reading abilities" (Grabe, 2009, p. 383). However, the promise of technological tools to enhance reading abilities remains.

Nomass (2013) analyses the impact of using technologies when teaching ESL. It is explained that computers can increase the students' reading interest. When utilizing computer programs, reading comprehension can be improved. Some conclusions remark that incorporating technology in the process of learning becomes compulsory and that English language teachers and professors should motivate learners to use technology to help language skills development (p.113).

An essential argument for increasing the investigation of technology and reading is that technology has already arrived in students' lives. Therefore, students should be encouraged to interact, use, and learn from it. They have to learn to read no matter the format, either from a written paper or from the screen.

A research study carried out with college EFL students worked on the effects of computer concept mapping in English reading, showing that the idea of mapping learning strategy using computers had better reading benefits (Liu et al., 2010, p.436).

CALL (Computer Assisted Language Learning) appeared in the 80s. Dudeney and Hockly (2007) claim that "early CALL programmes typically required learners to respond to stimuli on the computer screen and to carry out tasks such as filling in gapped texts, matching sentences halves and doing multiple-choice activities" (p.7).

For all those activities, the computer offers the students feedback. CALL is one approach that may still be found on many published CD ROMs whose objective it to teach language. Moreover, CALL has moved beyond the use of computer programmes to include the use of the Internet and web-based tools. As a result, the concept technology enhanced language learning (TELL) replaced CALL. TELL appeared in the 90s in response to the vast possibilities offered by information and communications technologies (ICTs).

Dreyer and Nel (2003) carried out a quasi-experimental study in the context of ESP. It describes the teaching reading strategies and reading comprehension within a technology-enhanced learning environment. The results showed that students who received strategic reading instruction in this environment got significantly better scores than the control group. It consisted of printed study guides, face-to-face sessions to give additional information on strategies, and a technology-enhanced feature (LCMS, Learning Content Management System - Moodle) (p. 349). The findings suggest that the three components enhance the development of students' reading comprehension.

According to Chapelle (2001) teachers push their students to start with educational and instructional solutions in order to solve their learning problems. However, regardless of whether instructors support this point of view, they are far away from the real solution to this issue, since CALL needs to be evaluated through clear methodologies. Nevertheless, it can be conceptualized considering only comparisons between sophisticated modern technological tools and other outdated media (p. 44).

In order to solve the evaluation problem, Chapelle (2001) offers basic principles for CALL as an instructional solution to instructed SLA (Second Language Acquisition). They are: selecting a range of target structures, selecting tasks with the utility condition, choosing and ordering tasks to get a balanced development, taking advantage of the opportunities of focus on form through attentional manipulation, and utilizing cycles of accountability (p. 45-46).

Moos and Marroquin (2010) present a literature review on the role of three popular computer-based instruction (CBI), multimedia, hypermedia, and hypertext. Particularly, it examines the effect of these CBIs on motivation. Some of the operational constructs in order to carry out this review are individual interest and intrinsic and extrinsic motivation. Among the findings worth mentioning are: learning with CBIs increases interest, and personal interest is improved in student centred environment that gives students the opportunity to feel autonomy (p. 265).

Additionally, innovative teaching strategies in EFL aim students to engage their learning, making the process more effective and efficient. They contribute to developing learners' language skills and impact positively the student's learning, which enhances their motivation and experience (Paragae, 2023, p.3).

Methodology

This is a quasi-experimental study because the learners were divided into two groups of work, a control group and a comparison or experimental group, and they also were submitted to pre and post tests. Thyer (2012) explains that the terms control group and comparison group have somewhat different meanings. A control group is one that does not receive any kind of formal treatment at all. Generally, the sole contact that members of a control group may have as a result of their participation in this type of study is via the process of being assessed. A comparison group refers to individuals who receive some sort of alternative treatment" (p.5).

The training using IGOs was systematic in this EFL reading comprehension context. Besides, this study is also analytical - nomological, because it collects the data through an experiment, in this case, the use of a new teaching strategy (Nunan, 1995, p.4).

The Sample

The sample was a group of Chilean engineering undergraduate learners placed in Santiago de Chile.

The researcher was part of the staff of the EFL university professors. There was no conflict of interest because the research problem was public and the process was approved by the university authorities.

The recruitment process was a meeting where the students agreed voluntarily to participate voluntarily by signing a consent letter. Their ages were between twenty and twenty-five years old. The learners were separated into an experimental group with twenty-six students and a control group with twenty-seven students.

They were all studying an English reading and writing course which final learning objective was level A2 according to CEFR (Common European Framework of Reference). The study's sessions were held during routine classes.

The students were enrolled in two equivalent groups according to the next detail:

- 26 students (4 females and 22 males)
- 27 students (5 females and 22 males)

For the purpose of this research study, both groups shared the same characteristics and posse the same level of English, A1 according to CEFR.

The Variables

The variables of this study are detailed in the next table:

Table 5. Variables

VARIABLES		
Independent		*Dependent*
Experimental group	*Control group*	The results of the pre and post-tests on EFL reading comprehension
The use of IGOs	The use of traditional strategies	

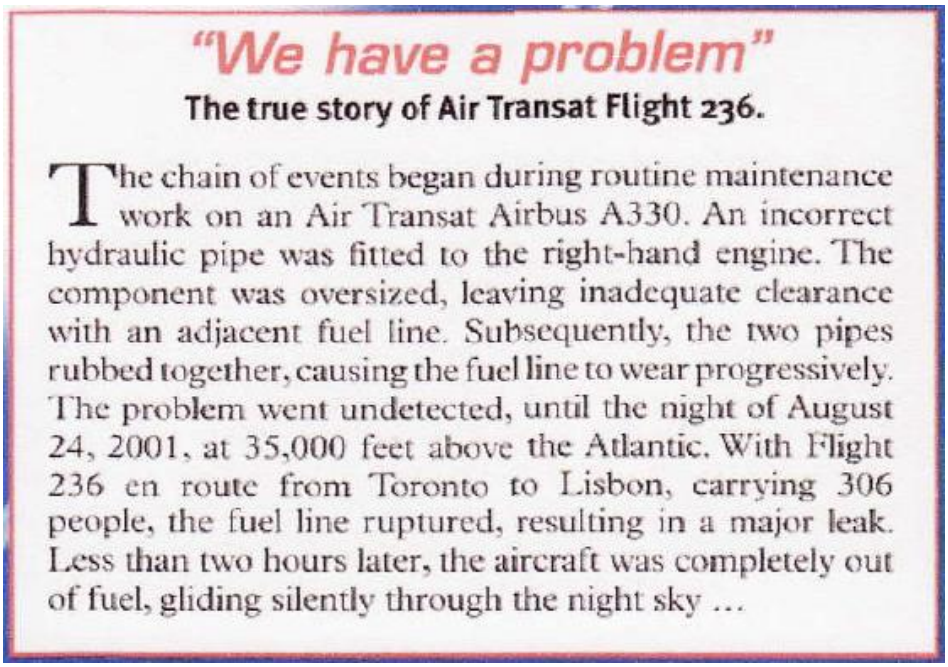
Instruments to collect data

Pre-test

At the beginning of the lessons, learners took a pre-test in order to read and comprehend the story about energy. It was taken from TOEFL – Free Practice Tests for learners of English, publicly available. A topic that engineering students also study in Spanish subjects in this university career.

Texts

The researcher chose six comparable texts in reading difficulty, length, structure, and content. All of them, similar to the ones they used to read and study in the English course. The themes were related to the engineering career, i.e. ESP (English for Specific Purposes). Therefore, the contents were about engineering related to those careers. An example of a text can be observed in Figure N°5.



"We have a problem"

The true story of Air Transat Flight 236.

The chain of events began during routine maintenance work on an Air Transat Airbus A330. An incorrect hydraulic pipe was fitted to the right-hand engine. The component was oversized, leaving inadequate clearance with an adjacent fuel line. Subsequently, the two pipes rubbed together, causing the fuel line to wear progressively. The problem went undetected, until the night of August 24, 2001, at 35,000 feet above the Atlantic. With Flight 236 en route from Toronto to Lisbon, carrying 306 people, the fuel line ruptured, resulting in a major leak. Less than two hours later, the aircraft was completely out of fuel, gliding silently through the night sky …

Figure 5. Example of a Text

IGOs

Given that the texts deal with identifying cause and effect, sequence and advantages and disadvantages (pros and cons) strategies, the corresponding IGOs that fulfil those strategies were chosen: cause and

effect, sequence of events and pros and cons.

Strategies for reading comprehension

✓ The inventory of strategies was taken from the list of key components proposed by Beyer (1987, p. 27).

✓ Effective reading comprehension strategies were taken from the list of Grabe and Yamashita (2022, p. 301).

✓ The graphic organisers categories were taken from Gallavan and Kottler (2007, p. 118-119).

Post-test

At the end of the lessons, learners took most of the tests described in number one (pre-test). The change was that synonyms for some English words were used, such as used-utilised. Moreover, a group of questions was disorganised.

Method

In two weeks, during the English language lessons learners had, there were six sessions. Each training lesson lasted one hour. The intervention's activities were performed between October and November 2012.

The length of the intervention was decided on the number of class sessions available at the time of the research study.

The training was conducted by the researcher. It consisted of six sessions over the course of two weeks, three classes per week. This training should last between 50 and 60 minutes each.

Each lesson plan had the objective of learning a topic and practice reading comprehension skills using IGOs strategies.

The Table N°6 sums up the different activities for each group.

Table 6. Training summary

Experimental group (Online activities)	*Control Group (Not online activities)*
Part 1 (5-10 minutes expected) Warming activity: to ask learners a question about the topic to be studied.	Part 1 (5-10 minutes expected) Warming activity: to ask learners a question about the topic to be studied.
Second part (25-30 minutes expected) To read a text. Method: 1.- A short and printed text about the study's area (engineering) is given to each student. 2.- The learners read the copy silently once, to try to comprehend it. (To look up vocabulary, learners are allowed to use the online dictionary proposed by the professor or any other they have available). 3.- Another aloud reading of the same text is done by the professor or a student, or both, in order to clear up the words they do not know and understand the ideas.	Second part (25-30 minutes expected) To read a text. Method: 1.- A short and printed text about the study's area (engineering) is given to each student. 2.- The learners read the copy silently once, to try to comprehend it. (To look up vocabulary, learners are allowed to use their printed dictionaries). 3.- Another aloud reading of the same text is done by the professor or a student, or both, in order to clear up the words they do not know and comprehend the ideas.

Third part (15-20 minutes expected) Online activities. Method: 1.- Learners go to the platform in order to get the IGO. They got the guidelines and the IGOs for working on line activities for the lessons. For example, students are asked to identify the advantages and disadvantages of the text. 2.- Learners work with the strategy, such as the cause and effect IGO. 3.- Learners answer in an individual way the strategy and left the responses about the advantages and disadvantages of the text to be uploaded into the platform. 4.- The professor gathers all the responses from the platform.	Third part (15-20 minutes expected) Notebook activities. Method: 1.- Students read the guidelines on the whiteboard. For example, students are asked to identify the advantages and disadvantages of the text. 2.- Learners are given a blank sheet by the professor. 3.- Learners write individually their responses about the advantages and disadvantages of the text in the blank sheet. 4.- The professor gathers all the written sheets.

Quantitative Results

Despite only six sessions being held in the classrooms owing to the computer labs available at that time, the experimental group and the control group could work successfully according to the activities scheduled. The two groups of students followed the instructions explained in the table 6 as was expected.

When the pre-test was analysed, the results suggested that the control group had more ability when reading English language texts, because their scores were thirty percent better than the experimental group as can be noticed in the figure N°6.

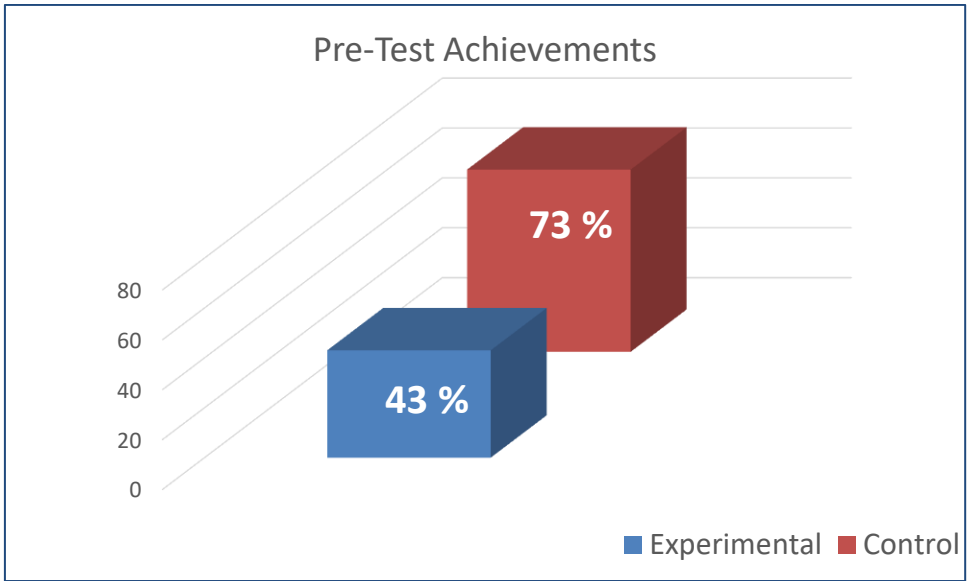


Figure 6. Pre-test Achievements

The post-test achievements of the two groups of study stated similar results since the experimental

group demonstrated better English reading comprehension as was in the pre-test exam. Hence, the control group had weaker students' abilities when reading in English language. In this test, the difference between the two groups was twenty percent as it can be illustrated in the figure N°7.

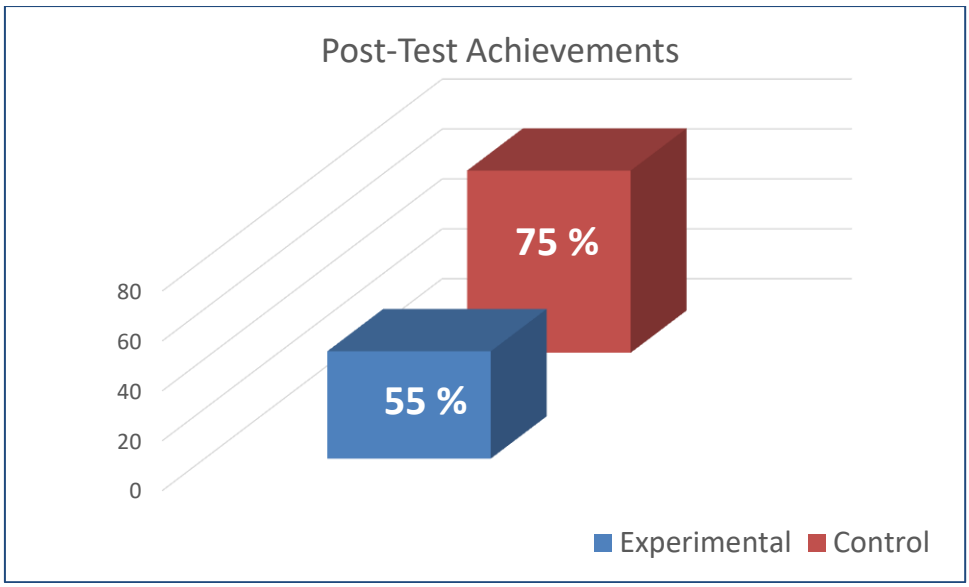


Figure 7. Post-test Achievements

The pre-test compared to the post-test shows that there is a bigger improvement in the experimental group which worked with the IGOs strategies. The figure N°8 illustrates the achievements differences between the groups of the study.

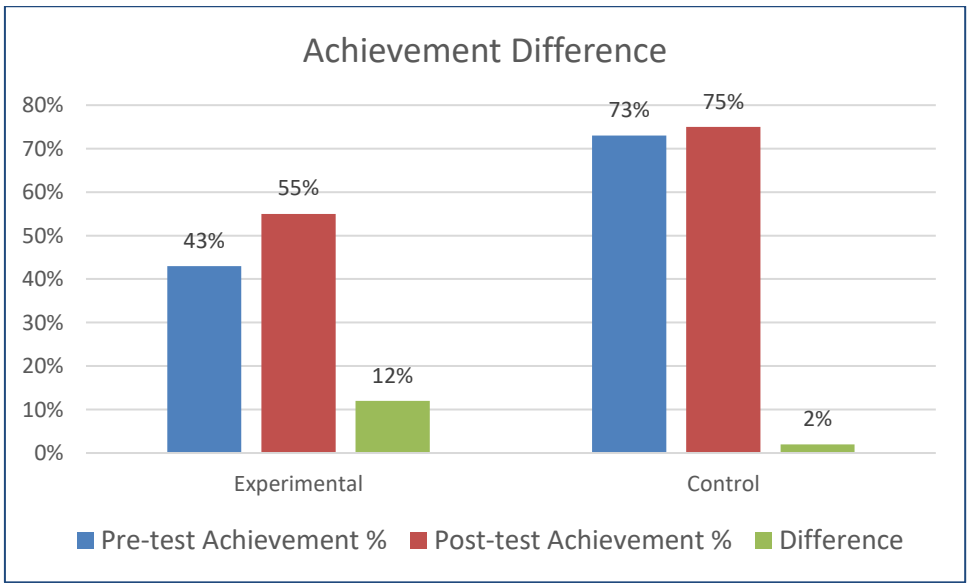


Figure 8. Achievement Differences

The two groups showed better results in the post-test when compared to the pre-test. The control group had seventy-three percent of achievement in the pre-test and almost the same in the post-test, seventy-five percent. On the contrary, the experimental group achieved forty-three percent in the

pre-test compared to fifty-five percent in the post-test. It was an increase of twelve percent in the students' achievement of the experimental group.

Some IGO's answers from the experimental group can be analysed in figure N°9 and figure N°10.

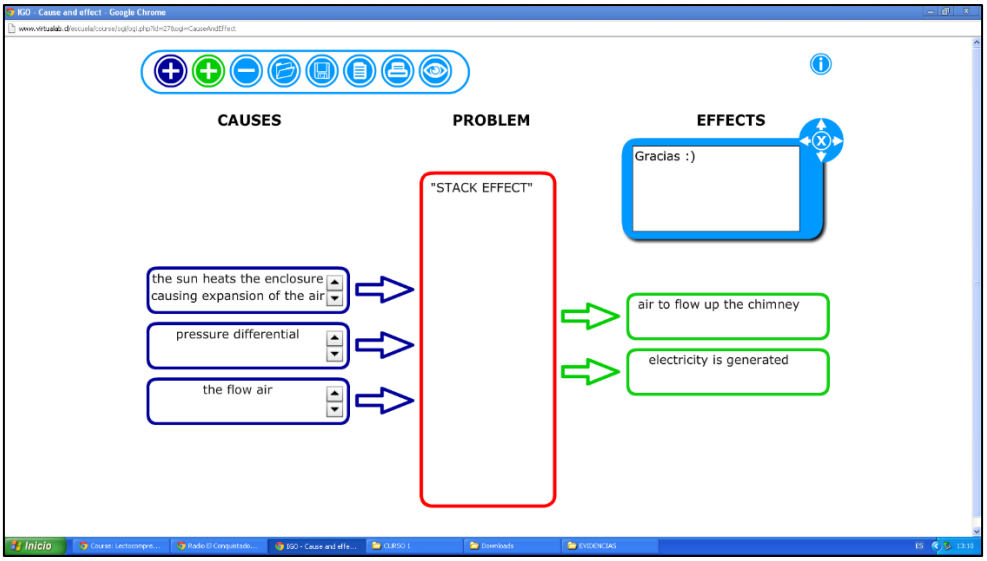


Figure 9. Example of IGO Answer

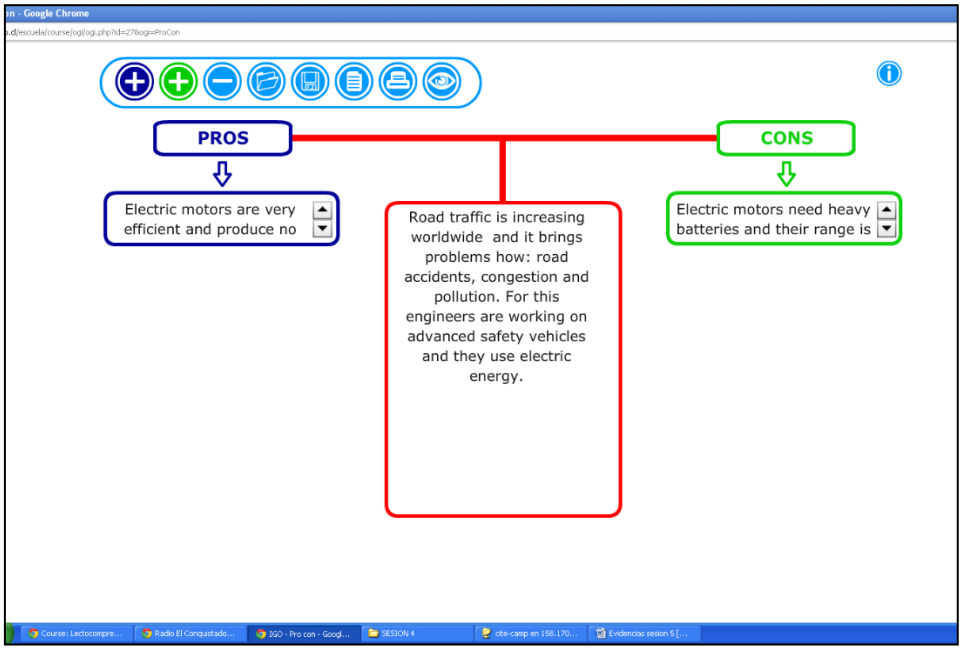


Figure 10. Example of IGO Answer

Therefore, the research question: *Can Chilean engineering students increase their EFL reading comprehension skill by using IGOs strategies?* was answered positively, since the findings would suggest that the IGOs strategies would enhance the Chilean engineering students' skills when reading EFL texts.

Discussion

Positive results were obtained in this study. The students' achievement of the present study reports that the IGOs learners increase their scores in twelve percent. In contrast, the other group enhanced two percent.

Nevertheless, the learners' background should be considered as an important variable among the ones on any study of this type, because as it was explained in the quantitative results of this article, the control group scored better than the experimental group in the pre-test, improving only few scores in the post-test. Therefore, organisers are useful for EFL students with little prior knowledge.

Moreover, graphic organisers develop information recalling and a better understanding of reading because those strategies help to organise ideas, which was probed in this study and also to raise text structure awareness. Cause and effect IGOs have demonstrated to be helpful not only for proficient readers, but also for inexpert students.

On the other hand, the top-down models could be instructed using IGOs since they help to see how information is organised, as those models state a strategic process to enhance memory and comprehension, promoting effective learning strategies.

IGOs were used after the reading in this study, proving that can be useful in this part of the reading comprehension process. However, it is advised that as a tool that helps to organise and comprehend the text, they can also be scheduled before or during a session.

On the other hand, quantitative research studies offer additional information about the achievement of learners' skills using IGOs. Hence, this study, as a quasi-experimental investigation, is another contribution to this field of study, because it also demonstrated that IGO software provides intelligible input when teaching EFL to Spanish university students. Consequently, the EFL instruction should include this type of graphical and technological strategy in order to encourage significant reading comprehension learning skills, such as the ones studied in this project, how to organise and analyse an English text.

A suggestion to further studies is that teachers innovate by using an effective strategy, like the one used in this study, in order to align the students' needs and capacities creating a positive learning environment, for both, professors and students.

Furthermore, IGOs strategy confirmed to be a very good tool to give students the opportunity to work autonomously. Students can improve their EFL reading comprehension skills by working on their own and by receiving feedback immediately about the reading comprehension activity in the class. The instant feedback is one of the IGOs benefit that saves time to professors, because they do not have to check or review the answers, they are given by the IGOs software, which is a very good support in the pedagogical work.

As EFL was enhanced using IGOs, they could also be useful to comprehend ESP (English for Specific Purposes) materials among others linguistics fields that could be investigated.

Concerning technology, IGOs show that when designing a well-structure software, students can learn how to develop their skills and then, enhance their reading comprehension scores. Therefore, IGOs are very recommended as valued technological tools. However, still few studies in this field that support IGOs have been investigated. Moreover, as an effective tool, IGOs could be considered as TELL methodology, because they proved to be a real solution to support reading instruction.

Another issue it to consider using IGOs in any English course, not only level A2 CEF, but any other English language level, since they proved to be useful as a reading comprehension learning strategy.

The sample of this study was university students, however, not only young and adult people can be benefit from using IGOs in EFL reading comprehension instruction, but also it is suggested that younger or older groups of students could use IGOs successfully when reading an English text.

Another variable to consider is that computer labs have to be available when working with technological tools so that an extended period of time can be analysed. Further studies are

recommended for longer periods in order to support the graphic organizers effectiveness. Additionally, it is recommended to carry out more sessions and look for larger groups of participants to continue investigating in this field of study. Hence, the learners' achievements can be generalized.

Lastly, summarising the benefits of GOs, they have central strengths when implementing in an EFL lesson: they are useful reading comprehension tools to teach EFL students. They are easy to work with and offer opportunities to appreciate and increase the experience of learning.

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