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IMPACT OF THE APPLICATION OF READING STRATEGIES ON THE DEVELOPMENT OF

INTENSIVE READING COMPREHENSION IN A CONTENT-BASED SCIENCE CLASS

Impact of the Application of Reading Strategies on the Development of Intensive Reading
Comprehension in a Content-Based Science Class

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Abstract

Reading comprehension is a determining skill to be developed in content-based learners. Based on this assertion it needs to be seen under the perspective of both content and language. This is because reading comprehension constitutes one of the most important language abilities that might facilitate the comprehension/understanding of content topics. This research project aims to establish a relationship among the application of reading strategies (skimming, scanning, semantic mapping, guessing the meaning of words, and vocabulary analysis) and the improvement in content learning in a group of 20 seventh graders from Colegio San Bartolomé La Merced, a private institution in Bogotá, Colombia. The instruments used to gather information were students' artifacts, a pre and post focus group, and a teacher's journal. Data was qualitatively analyzed using the grounded theory model. The qualitative analysis shows that reading strategies lead to the development of better comprehension of science topics as well as to improvement of reading comprehension pace. In that way, reading in science could be seen as a dynamic process where reading strategies could enhance the understanding of the specific science topics.

Key words: Intensive reading comprehension, CLIL approach's fundamentals, reading strategies.

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Resumen

La comprensión lectora es una habilidad determinante que debe ser desarrollada en los estudiantes que cursan un área de contenido como Ciencias Naturales en un ambiente bilingüe. Basados en esta afirmación, el desarrollo de esta habilidad necesita ser visto desde la perspectiva del contenido y la lengua al mismo tiempo. Esto se debe a que la comprensión lectora puede facilitar la comprensión de los contenidos propios del área de Ciencias Naturales. Este proyecto de investigación busca establecer una relación entre la aplicación de algunas estrategias de lectura (revisión superficial del texto, escaneo de texto, mapas semánticos, identificar el significado de las palabras de acuerdo al contexto y análisis de vocabulario) y el mejor desempeño en el aprendizaje de contenido específico del área de Ciencias Naturales en un grupo de 20 estudiantes de grado Séptimo del Colegio San Bartolomé La Merced, una institución privada de Bogotá, Colombia. Los instrumentos empleados para recoger información fueron los productos elaborados por los estudiantes, dos sesiones de pre y post grupos focales y, el diario de profesor. Los datos fueron analizados cualitativamente empleando el modelo propuesto en la Teoría Fundamentada (grounded theory). El análisis cualitativo mostró que las estrategias de lectura condujeron a mejorar la comprensión de los temas específicos de área de Ciencias Naturales como también a mejorar el ritmo de lectura. De esta forma, la lectura en la clase de Ciencias Naturales puede ser vista como un proceso dinámico donde las estrategias de lectura pueden favorecer la comprensión de los temas específicos del área.

Palabras clave: Comprensión de lectura intensiva, principios fundamentales de CLIL, estrategias de lectura.

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Chapter One: Introduction

The teaching-learning process in a content-based subject can bring in different problems inside a classroom. On one hand, dealing with language awareness and its applications in a scientific context could be a complex process for a secondary learner, even for an adult; and on the other hand, the management and appropriation of some particular content-based knowledge in English demands the development of specific students' skills.

Facing this problematic situation some authors (Coyle, et al., 2010; McDougald, 2009; Megías, 2012; Mehisto, et al., 2008; Meyer, 2010) have directed their research into an important issue which is the methodology regarding success in both English acquisition and subject content in learners. One of these models is Content and Language Integrated Learning (CLIL). It has gained some relevance in the educational context because it involves important considerations regarding curriculum content learning and language learning, which are still generally seen as two separate pedagogic issues; instead of they should be consciously taken into account in an integrated way in classroom-based bilingual scenarios as Leung (2005) cited by Llinares, et al. (2012) argues.

In this research project I focused on some applications of the CLIL approach for the improvement of reading skills of seventh graders at Colegio San Bartolome La Merced in Bogotá, Colombia where a 20-group of students are showing difficulties in reading comprehension skill; this constitutes one of the main aspects in developing proper levels of comprehension in a content-based subject (science class) that consequently could benefit students' performance and outcomes. Fostering reading comprehension in a content-based classroom by the application of some strategies could have a positive effect in the institution and the educational community; students could learn how to read

appropriately, or at least, more effectively, how to take and extract the main ideas of a scientific text, etc. Additionally, it could be applied to elementary and different secondary levels.

Statement of the problem

The students that participated in this research project form a group of 20 learners from seventh level from Colegio San Bartolomé La Merced. This is not a bilingual school; however, it has special emphasis in English learning through three content-based subjects: information technologies, mathematics and science. The inclusion of these content-based subjects in the curriculum starts at early stages of education in pre-school. In secondary levels, learners are exposed to two hours of information technologies, five hours of mathematics and 5 hours of science a week; this is a high demand in terms of language abilities that the student has to face in order to be successful in this academic setting. Based on this demand, I have observed some problems that affect the learning process in content-based classes (science). For example:

- The comprehension of topics related to content-based areas (science for this particular study) focuses on difficulties associated to reading comprehension skills. In most of the cases, students take a lot of time trying to understand and select the main ideas from a scientific text. This also lowers motivation caused by frustration when a student cannot cope with reading comprehension difficulties.

- The students usually worry about the meaning of every single word in order to translate them from English to Spanish trying to understand what is expressed in a text.

- The students lack reading strategies that allow them to get important ideas to comprehend a scientific text.

The factors considered above, that make the acquisition of proper daily routine study habits difficult and lower students' motivation as well as self-confidence were observed, examined and analyzed as a part of the preliminary work done at the early stage of the construction of the current action research project and along the pre focus group session as well.

In fact, strong reading skills are vital for success in science classes because of the high proportion of reading assignments. It demands the use of specific reading strategies that might make the process easier and enjoyable allowing the improvement of reading skills. The target students lack these reading comprehension elements and usually have problems in comprehending scientific topics due to the misunderstanding of the information taken from reading sources. Evidences of these problematic issues were taken from the pre focus group intervention; during this session, all students (100%) displayed their difficulties (see chapters 5 and 6). The purpose of the current research was to provoke some changes if possible by means of the implementation of reading strategies in a CLIL science class.

Justification

This research project sets out to provide the students with some strategies that help them to advance easily and faster in their learning of a content-based subject (science), especially in reading comprehension which involves cognitive, affective and linguistic issues.

To fulfill students' needs in terms of reading comprehension skills, there must be some strategies (provided by the teacher) to support him/her. According to Coyle and Hook (2010), "The teacher is involved in maintaining a balance between cognitive challenge for learners and appropriate and decreasing support as the learner progress." (p.34). As a consequence, the strategies must be the final result of a complete analysis and appropriation of a variety of learning tools, theories, previous

research studies in this field between other elements which have being missed in science teachers'
daily practice that could work in concordance with the special needs of the students.

The main goal of this project was to observe the impact of the application of five reading
strategies (skimming, scanning, guessing the meaning of the words, vocabulary analysis and semantic
mapping), in the improvement of intensive reading comprehension in seventh graders from Colegio
San Bartolomé La Merced under the CLIL approach, bearing in mind that this has been tested and
qualified successfully in both different educational scenarios, Colombian and overseas
(McDougald,2009).

In consequence, this qualitative action research project addresses the following research
question with the corresponding objective:

Research question

To what extent can the application of reading strategies help seventh graders develop intensive reading
comprehension in a content-based science class?

General objective

To determine the impact of the proposed reading strategies on the development of intensive reading
comprehension in a content-based science class

With this general view of the scenario where the current action research project took place, the
author started and sequentially advanced in a field that nowadays is important to be considered not
only by a content-based teacher but also by English teachers in general.

This fact is particularly true for those who want to include specific themes in the development
of their lessons regarding globalization issues which make part of the modern educational phenomena

in times where learning a second language is important but, not enough; in times where learning content through English is a trend.

      The subsequent chapter presents the literature useful to support and provide a clear perspective of the theory related in this study. It also presents similar studies done on the use of reading strategies and the impact these studies have had in the learning process of a language, more specifically, in reading comprehension improvement.

Chapter Two: Theoretical Framework

This chapter involves two main sections. The initial part makes reference to general aspects of reading skills, intensive reading followed by a review of CLIL approach and, the second part, emphasizes on the most relevant studies done in Colombia and overseas regarding intensive reading comprehension issues.

Reading and intensive reading

Despite the fact that the current action research focuses in the development of intensive reading comprehension skills, it is necessary to offer a wider landscape where reading can be considered in a holistic way, showing multiple sides and scopes depending on the context (English or content-based classrooms).

From a general perspective reading is one of the most effective ways for language learners to acquire language skills in context (actually it represents one of the main sources of input). For this reason, appropriate reading abilities might increase not only reading comprehension, but also writing style, vocabulary, spelling and grammatical development (Krashen, 2004).

The reading process is not as easy as it seems; some authors, for example, Brown (1994) and Jimenez (2000) have considered the reading process as a "psycholinguistic game" where the reader must first recognize a multiplicity of linguistic signals such as letters, syllables and then, use the linguistic data processing mechanisms to impose some sort of order on these signals. This constitutes a permanent process where the reader must infer meanings; decide what to retain and not to retain in a long and cyclic scheme.

Regarding the acquisition of these cognitive abilities, it is necessary to provide the students with some special strategies that help them to get the best performance; some of these strategies are

called micro skills. For example, identifying the purpose in reading, decoding, silent reading techniques, skimming, scanning, semantic mapping, guessing, vocabulary analysis, and the distinction between literal and implied meanings are important to enhance proper levels of reading comprehension.

Although it is true that reading comprehension involves a series of cognitive abilities, it is not acceptable to consider them in an isolated manner. It is necessary to join them with students' experiences as Nunan (1999) and Jimenez (2000) argue. They explain that learners interpret what they have read in terms of what they already know and integrate what they already know with the content of what they are reading.

In that way, learners' knowledge and expectations about the world will strongly affect the ability to understand new information by providing a framework within which that new information might fit. In this process, some tools are important to be considered, one of the most important is a well-thought task; this will provide students with a topical framework for processing and analyzing the text, it involves oral reading in groups or in peers, involves students in direct analysis of the text instead of indirect question answering, and involves the transfer of information from text to visual or diagrammatic representation; elements of vital importance in developing reading comprehension abilities.

In the specific case of intensive reading, which is the focus of this research project, Nunan (1999) is emphatic in its purpose; he explains that intensive reading involves the detailed reading of texts with the two goals of understanding the text and learning language features through a deliberate focus on these items; ideas that are taken into account in the development of the current action research project.

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As Nunan affirms, the reading process facilitates the reconstruction of a message which has been encoded by the writer as a graphic display. Regarding intensive reading it is not different; the final goal is to produce comprehension. To do this, some models have been adapted; one of them is the schema theory which involves a series of processes that demand mental abilities. In this the reader's background knowledge interacts with conceptual abilities and process strategies to produce comprehension (Coady 1979). He proposed the top-down and bottom-up approaches in which, the reader is an active participant, making predictions and processing information, two of the most important elements in intensive reading.

According to Coady (1979), in his schema theory, a text only provides directions for readers as how they should retrieve or construct meaning of their own. Comprehension of a text requires the ability to relate the textual material to one's own knowledge. Comprehending words, sentences, and entire texts comprises more than just relying on one's linguistic knowledge.

This is concordance to what Carrell et al. (1998) and Tracey et al. (2012) argue that a text only provides directions for listeners or readers as how they should retrieve or construct meaning for their own, previously acquired knowledge. This previously acquired knowledge is called the reader's background knowledge. According to schema theory, the process of interpretation is guided by the principle that every input is mapped against some existing schema and that all aspects of that schema must be compatible with the input information (Carrell, et al., 1998:76) that in fact, represents the fundamentals of bottom-up and top-down processing systems.

Taking into consideration the aforementioned facts about reading and intensive comprehension as well as the students' needs, the following were the strategies applied during the pedagogical intervention stage based on Brown (1994):

- Skimming: A quickly running one's eyes across a whole text that allows the reader to predict the purpose of a passage, the main topic or message, and possibly the supporting ideas.

- Scanning: A quickly searching for some particular piece or pieces of information in a text.

- Semantic mapping or clustering: As Meyer (2010) supports. These elements help the reader to produce some order of the ideas of a text, usually, in hierarchical manner.

- Guessing: It is helpful to guess the meaning of a word, a grammatical relationship, content messages

- Vocabulary analysis: Analyze words in terms of what the learner knows about it.

The application of previous reading strategies in a CLIL classroom demands not only to know about reading/intensive reading fundamentals but also the inclusion of a dual-focused model that, in a certain way, could join this language skill and content learning; this is why CLIL principles are going to be addressed in the next section.

CLIL (content and language integrated learning) approach

According to Coyle, D., Hood, P. & Marsh, D. (2010). CLIL is a dual-focused educational approach in which additional language is used for the learning and teaching of both content and language (p.1).

International studies of the impact of CLIL approach inside the classroom started at 1980´s (Megía,2012); before that, there were other different models and studies such as the Canadian immersion programmes and content-based instruction model which focused only on foreign language teaching and learning; their main difference with CLIL is the fact that the latter permits integration of content and language.

Additionally and based on subsequent studies, it was demonstrated that CLIL fundamentals could be applicable in all educational levels no matter the age of learners, time of exposure or pedagogic aims (Coyle, Hood & Marsh,2010).

In addition to increasing the students' exposure to the foreign language, CLIL also contributes to the development of cognitive abilities (Marsh, 2000); in fact, in a bilingual context, where CLIL is implemented, learners process concepts at a deep level and can better internalize and retain information.

Learning content through English is not illogical. Despite the fact that CLIL is a foreign model, it is not an unsuitable idea in Colombia. Actually, its application might represent a positive challenge in the context of Colombian education. According to McDougald (2009), who has worked several years applying the CLIL approach in the Colombian context, to be in contact with a foreign language when learning other contexts support the learning process. Also, this can enhance communication in the modern and globalized world, where education represents one of the most relevant and changeable scenarios.

Based on previous explanations, the inclusion of this specific approach in the current action research project is essential. Furthermore, several studies, for example (McDougald, 2009) support that CLIL has been a successful approach, even in Latin American countries like Colombia where some private schools and universities have been adapting its fundamentals. The benefits are multiple due to its dual-focused education pattern; on one hand its relationship with the specific subject, topic, or theme and on the other, its linkage with language.

Content-based areas are appropriate scenarios to fulfill the integral teaching-learning practice in all dimensions. But, regarding the purpose of the current research project, the emphasis was placed on reading; input by reading is a common practice inside the science classroom. This constitutes a strong mainstay in classroom work, but, at the same time, represents one of the main issues to take

into consideration due to the impact it could have on the learning process. In that way, there must be a point in which reading, as a language element could converge with specific contents (science), and, in this point learning could take place.

CLIL approach was born in the mid-1980s with the clear objective of using language as a tool to learn non-language subjects in which both, language and subject have shared roles (Mehisto and Marsh, 2008). Both language and content are considered integral parts of a whole and complex structure that is completely dynamic and interactive in the way they operate in the educational context.

In consequence, educational curriculum might guarantee better access to language, learning, and learning methods for accelerating performance (Coyle, Hood & Marsh, 2010). Then, to implement a new and challenging approach can be considered one of the strategies regarding the proposed objective. In that way, learners need to be exposed to tasks which require from them to focus on problematic issues, which then, can be used in meaningful situations.

The situation could be better understood if we picture ourselves in a science classroom where a student is exposed to an input (listening or reading) fostering his/her personal output but, he/she has to face a base problem, reading comprehension. As a result, students who are guided to content-based topics are led to a progressive use of language and to support their understanding about language on the base of one important skill, reading in a comprehensive and autonomous way.

According to Mehisto, Marsh, and Frigols (2008), the language requirements in a content-based class must include technical vocabulary, special expressions, multiple meaning of words, syntactical features and language functions which predominate in a particular content-area (informing, defining, analyzing, classifying, predicting, inferring, explaining, justifying). All of these language and cognitive abilities can be developed and improved while advancing in reading comprehension and

enhanced with the practice of student-centered interactions making possible cooperative work, focused on problem-solving activities that can be particularly useful; in this way, students become more engaged and interested in learning a particular topic.

Other advantages of the application of CLIL approach are shown by its underlying principles which are basically two: language is used to learn as well as to communicate; the subject matter determines the language needed to be learned (Mehisto and Marsh,2008). They gave support for further studies like Coyle, Hood & Marsh (2010) in which they suggest the 4Cs Approach to an Integrated Curriculum where the two principles interact in an almost perfect dynamic. The 4Cs are: content, progression in knowledge, skills, and understanding related to specific elements of a defined curriculum; communication, using language to learn while learning to use language; cognition, developing thinking skills which link concept formation, understanding, and language; culture, exposure to alternative perspectives and shared understandings. All of the 4C´s are linked to the ability to read and to comprehend what the learner reads. Another of the important benefits of the application of CLIL approach that has been studied and supported by some authors (Coyle, Hood & Marsh, 2010; Mehisto and Marsh,2008) is its positive effect on learners' motivation that involves attitude and affective states that influence the degree of effort that learners make to learn a second language or the content-based topic. Affective strategies develop self-confidence and perseverance needed for learners to involve themselves actively in language learning (Krashen, 2004), this is a requirement for attaining communicative competence.

As a consequence it is important to expose the learner to a constant input that gradually will help him/her to acquire language elements to benefit adequate communication in a specific context. For that reason, some authors suggest strategies to encourage the students´ comprehension; for instance, Short (1991) mentions the importance of checking comprehension through cloze exercises which are

popular for assessing reading comprehension and could be applied to different subjects areas. Another strategy proposed by her is to let students to do story summaries, showing that this activity has two main components based on a reading chunk: pictorial and written which imply two of the most common learning styles, visual and auditory.

In addition to the considerations above, reading strategies could also help to convert information from one mode of representation (a text) into another, more graphical form (map, chart, graph, etc.). Also from one mode of representation in the mother tongue into one in the second language, that, according to Meyer (2010), fosters both language and content learning and also takes into account the individual needs of students because of their different learning styles and multiple intelligences.

State of the art

In the last years reading comprehension has been a significant issue that has worried educational communities at all levels, this is a broad and variable problem that has shown multiple facets; researchers have focused the attention on this due to its importance as one of the most usable sources of input.

In Colombia some studies have been done. One of them is related to the current situation of CLIL in Colombia showing most of the positive aspects of its application in Colombian contexts and its future, pointing the need to train teachers in its fundamentals and application (McDougald, 2009).

Other local studies are related to the application of CLIL approach in content-based classrooms (Bogoya, 2010), while another focuses on reading comprehension (García, 2008).

In her study, Bogoya (2010) proposed a possible solution to the reading comprehension issue. She developed a study in which she joined the CLIL approach regarding the improvement of reading

comprehension in students of fifth level. The gotten results pointed out the importance of promoting

different activities before and after students read a given text (i.e. sharing in pairs, making a summary,

asking questions, listening to the teacher´s point of view) in order to make students more participative

and engaged when reading. Also, the study showed that reading comprehension implies approaching a

text from different perspectives so that meaning is constructed. She said that asking students to read a

text two or three times, each with a different focus was proven to be effective if students have a

specific purpose. In this, CLIL played an important role in which language improvement is derived

from content-driven classes where language strategies have been incorporated. These findings

constitute the basis for the current study in the sense that her project took place within a private school

and the target group was taken Physics as a content-based subject; aspects that can be compared with

the context of the current project.

Meanwhile, Garcia (2008), explains the importance of developing strategies towards the

comprehension of a text. According to him, strategies must be proposed taken into account the needs of

a reader. One of the strategies he proposed is based on skimming and the other on scanning. In his

research he considered some scanning techniques which are important especially in intensive reading,

they are: recognition of prepositional phrase, infinite phrase, nominal phrase, verbal phrase, and finally

the sentence itself.

In agreement to his work it is important to consider the application of reading strategies to

foster reading comprehension abilities which is the purpose of this project. But, the strategies must be

thought based on the students' needs; this was one of the master pieces in deciding the best strategies

to be used/applied along the current research project.

Efforts in the field of reading comprehension's improvement are not only local experiences.

Overseas, some authors have tried to study the same item in different educational contexts. One of

them (Yang, 2012) developed his project in China. Based on his experience, he argues that, in order to be an independent reader, it is necessary to develop learning strategies that could help learners to assimilate new information into their existing schemata, which then enrich it to more complex schemata. This idea is also supported by Slobin (1971), Anderson (1980) and Carrel (1984).

From the previous perspective, the inclusion of meta-cognitive and cognitive strategies determines the successful learning. The author points out the impact of meta-cognitive strategies like:

- Advanced organization. According to this author and Jones (1957) a reader cannot punctuate his reading with excursions to the dictionary. Instead of, the reader must first understand the general idea(s) of the text by a process of skim-reading.

- Selective attention. The author recommends to place in a different new document key words, concepts, and linguistic points; these elements can be used to forthcoming class activities.

Yang (2012), also suggest some cognitive strategies such as:

- Grouping. Mechanism that allows learners to classify words, terminology, or concepts taught/learnt in previous texts according to their attributes or meaning.

- Deduction/induction. Learners are led to apply grammatical rules to identify the forms of unknown words of the text, which leads to guesses about the type of words it would be.

- Elaboration. This is referred to a mental process of relating new knowledge to existing information in long-term memory. The author argues that in the field of reading comprehension students can use their prior knowledge, both academic and real world to make decisions about probable meaning.

- Inferencing. Students use immediate and extended context to guess new words. In words of Kang and Golden (1994) inferencing "help student develop strategies and knowledge to use internal and external contexts to infer meaning is a major step towards helping them become independent learners." (p.35).

All aforementioned strategies have the potential to enhance reading comprehension at all educational level. In this research project, the researcher took some of these strategies and adapted them to fulfill the target students' needs.

From the perspective of Shen (2008), she supports the idea that texts become easier to understand when the teacher enhances the students' prior knowledge. In that way, readers understand what they read because they are able to take the stimulus beyond its graphic representation and assign its membership to an appropriate group of concepts already stored in the memories. During the reading process, the reader brings information, knowledge, emotion, experience, and culture to the printed word to make decisions about what something "means".

In her study, she explored the schema theory fundamentals in a Chinese context where educational patterns tend to be rigid; as a result she got evidence of positive results in the application of bottom-up and top-down tasks.

In sum, all gathered information taken from local and abroad experiences in the field of reading comprehension improvement has provoked a positive impact in their contexts. Having previous experiences into consideration, there is a complete desire to apply reading strategies inside the science classroom where, usually they are not taken into account due to the fact that content-based teachers tend to focus on content aspects rather than the use/improvement of language elements that, in fact, could facilitate/foster the students' learning process.

In the following chapter the researcher will explain in detail the steps followed during the research design.

Chapter Three: Research Design

Action research in an educational context has its fundamentals in the idea that inside the classroom, a teacher can set out his/her own course of action to see how he/she might change things for the better (Harmer, 2007). Action research provides educators with alternative ways of viewing and approaching educational questions providing a new way of examining their own practices. In the current action research project, this is one of the purposes of the researcher. To do this, it is required, from the perspective of a researcher, to observe and analyze a specific issue from different angles/points of view. To make this systematic, the researcher used action research guidelines.

Figure 1. The cycles of action research

(Harmer, 2007, p. 417).

According to Harmer (2007), action research takes place in a series of procedures that allow teachers to improve aspects of their teaching or sometimes to evaluate themselves (see Figure 1). It takes place in cyclical stages that start with the identification of a problem/issue that is going to be

investigated (observing); this immediately leads to a set of questions that the researcher might answer through the investigation, based on the observations about the problematic situation (reflecting). Then, the researcher has to gather information; in order to do it, the researcher needs to find a systematic way to collect the evidence of the observations (planning); subsequently, the information is analyzed; the analysis will provide elements to conclude about the current action research (acting) but, additionally it will establish the starting point of a future study, that is why action research is considered a cyclical process.

Based on Burns (2010), this is an action research project because:

- It is integrated and conducted as part of a teacher's normal daily practice.

- It follows a reflective process which alternates between planned implementation and critical reflection.

- It uses flexible methods; data and interpretation are refined in the light of the understanding gained during the research process.

- It is an active process designed to generate change in small steps.

- It focuses on a single issue of school improvement.

- It is a planned and organized approach to answering a question.

The role of the researcher

In this action research project I worked as a participant-observer; I gathered data from the three different instruments to enable making proper decisions about what I did or the students were doing regarding the objectives of the investigation.

Based on the teacher's role as researcher I had specific responsibilities; according to Grabe and Stoller (2002), some of them were:

- Assess students' reading needs.

- Define meaningful instructional goals and objectives.

- Plan purposeful reading lessons.

- Adopt, adapt and develop instructional materials and assessment instruments.

- Provide feedback to students on various aspects of reading.

- Adjust daily lessons in response to students' immediate needs, responses and attitudes.

Context of the action research project

The school where the current action research took place was Colegio San Bartolome La Merced, which is a confessional catholic school located in downtown Bogota, Colombia. It has a traditional educational background that began in the early 1940s; since that time, the school has made several changes to its P.E.I (Proyecto Educativo Institucional for their initial words in Spanish. In Colombia, P.E.I represents the institutional compass to builds curriculums and must be guided by governmental settlements) due to the inclusion of updated educational approaches/trends that have been adapted in concordance to the school's needs.

Nowadays, the school has adopted the constructivist model with an emphasis in personalized education, trying to foster autonomy and regarding the development of integral women and men.

Regarding this integral component of the school's mission and the emergence of globalization; the area document (called P.I.A - Plan Integrado de Área) is thought to accomplish two goals. On one hand, the assertiveness in the use of specific language elements and on the other the application of those elements in the context of a content-based class where the student could acquire, apply and sustain communication with peers and people abroad, having science as a pretext to activate the process. The science area document (P.I.A) focuses on the development of academic and communicative proficiency.

In reference to the essence of the science area, seen under the light of Saint Ignatius pedagogy where experience, reflection and action represent the fundamentals, the most important criteria for the school is to consider the dynamics of nature as well as the interactions among living and non-living things.

In regards to the evaluation process, the science area has established some important elements that constitute the basis for assessment which are:

1. Scientific knowledge construction and communication

2. Natural science investigation skills development

3. Nature problems and solutions

4. Environmental conscience

Considering that science is taught completely in the second language, English as a communicative tool is essential for the assessment of criteria 1, 2, and 3 of the ones aforementioned before. In that way, students are learning science and reinforcing English skills. As a result, some issues have emerged, for this particular project, difficulties in reading comprehension of seventh graders.

Participants' profile

Level

According to the Common European Framework for Languages (CEF) and focusing just on the use of language, they have been classified in level B1 (threshold or intermediate) showing some important attributes as:

- Understanding of the main points of clear standard input on familiar matters regularly encountered in work, school, leisure.

- Dealing with most situations likely to arise whilst traveling in an area where the language is spoken. At this level students have traveled to Canada and England to take immersion courses.

- Produce simple connected text on topics which are familiar or personal interests. It represents one of the weaknesses of the target group.

- Describe experiences and events, dreams, hopes and ambitions, briefly give reasons and explanations for opinions and plans.

Based on their communicative skills, they are well trained to sustain a conversation in family, cultural and academic fields, using some simple sentences. However, and based on classroom observation, vocabulary represents a limitation.

General characteristics

They are 13 boys and 7 girls whose average age is 13. They commonly establish good rapport with the teacher that usually increases motivation to work and learn. Nevertheless, sometimes fluctuations of their emotions affect their academic advancement.

Most of the students of this group are visual and auditory learners in accordance to this, the teacher needs to design a wide range and variety of activities that could enhance their potentials and reduce anxiety that constitutes a negative factor causing, most of the times, student failure and lack of motivation, two common problems inside science content-based classroom.

Based on their cognitive needs, reading comprehension represents an important weakness; specific functions such as categorization, inference, deduction, recombination, elaboration represent significant challenges for this specific group of learners.

Accordingly, it is necessary to plan activities that allow students to overcome their limitations; tasks that let them infer, get main ideas, and organize information, establishing cause and effect sequences because, otherwise, the reading comprehension weakness could interfere in students' learning process and could further affect motivation.

Based on researcher's classroom observation, students with low reading comprehension performance were chosen as participants in this study.

Ethical considerations

In this study, I gave to participants the opportunity to decide whether they want to participate or not in the whole process. It was thought keeping in mind that reason (human ability/faculty to reflect about what is around), is the prime ingredient of ethical thinking and it is the combination of reason and a sense of rightness that researchers must keep faith with, if they are to bring a rich ethical quality to their work (Cohen, Manion & Morrison, 2000).

In order to assure this situation and because they are young learners, I wrote consent letters to ask both parents and children about their desire to participate in the research project. (See appendixes A and B).

Additionally, I decided to protect the identity of participants and assigned a number to each one. In that way, the researcher called them using numbers from 1 to 20 with the purpose of keeping names confidential.

Data collection instruments

I used three different types of data collection instruments: teacher's journal, students' artifacts and pre and focus group sessions.

Teacher's journal

According to Harmer (2007), journals are powerful reflective devices, excellent tools to provoke self-analysis and reflection about the teaching-learning process which allows introspection to make sense of what is going on around. In this research project, the journal was helpful to

register systematically the teacher's perceptions about the students' reading process and elements positively or negatively affecting it.

I used an electronic journal that works with a web application. In the first entry (appendix C), there is evidence of the aspects that I took into account for the daily analysis and reflection. I wrote a journal entry at the end of every session with the purpose of maintaining a record of positive aspects as well as constraints during the development of the project.

Students' artifacts

They represent the physical and concrete evidence of what the participants carried out within their context. I considered the students´ production of different kinds of graphic organizers and reading comprehension tests that had the main purpose of organizing information and decoding ideas of what was expressed in a written text. The representation of information in a graphic way could benefit the reading comprehension inside a content-based class. I evaluated the artifacts after the application of each strategy (every 2 sessions).

According to Burns (2003), other benefits of artifacts are represented in the facts that they allow illuminating aspects of practice, they are accessible resources of data, they show the changes students had had along the time and focus on content and situations.

Focus groups

I developed them in two specific periods of the research; at the beginning and at the end of the pedagogical intervention (see appendix D). The purpose was to compare the data in order to establish the impact of the pedagogical intervention in learners. This instrument is helpful because as Cohen and Manion (2007) explain, focus groups allow interaction within the group who discuss about a specific topic supplied by the researcher and it is precisely based on this interaction that the data emerge.

Indeed the insights that may not be available in a straight forward interview. Now, in terms of time, it facilitates to collect a large amount of information in a short period of time; also it could capture a whole range of opinion rather than a consensus.

Based on the fact that a researcher can get a better understanding of the aspects to be investigated if he/she views it from different positions (Sagor 2000), triangulation was used in this action research project; the three perspectives the that I took into consideration were: students' artifacts, the teacher's journal and the focus groups. By applying them, I compared information to determine corroboration; in other words, to guarantee qualitative cross-validation and to ensure reasonable validity and reliability by the use of multiple independent sources of data to answer the research question.

Validity and reliability were also important factors to be considered in a qualitative research because they provide consistency and trustfulness to the study by means of systematic ways of processing and analyzing the gathered information. According to Burns (2003), they are essential criterion for evaluating the quality and acceptability of research. Validity has to do with the truth or value of our claims and without validity there is no reliability, which has to do with consistency. Additionally to Burns' point of view, Tracy (2010) argues that also credibility is important in the sense that this represents a way to express the reality that is plausible or seems to be true.

As a conclusion to this chapter, it is important to mention that action research is a complete process where several variables were taken into account; some of them, involved the students as the main actors of the process, because the researcher took into account their needs and used them to construct a pedagogical plan that show some effect on the students' learning process.

In the next chapter, the researcher presents the specific strategies and methodology that she used with the purpose to produce an impact on the specific target group.

Chapter Four: Pedagogical Intervention and Implementation

This chapter presents a detailed description of the application of reading strategies inside the science classroom taking into account the CLIL approach that has been successfully applied in different educational contexts with positive results and could serve in this research project as a way to join language and content.

The specific objectives of the current pedagogical intervention were:

- To propose some strategies, that could be joined with CLIL approach and adapted to improve reading comprehension in seventh graders at CSBLM.

- To provide analytical tools to students of seventh grade with the purpose of improving their intensive reading abilities.

To reach these goals, the first strategy was to the design of 10 class sessions in which students received input and had the opportunity to work using some specific material that I designed according to their specific needs and leading to enhance comprehension reading skills. The sessions consisted of 2 class hours (50 minutes each one), which were implemented from September to December 2012 (see Appendix E) with students from seventh who study science in English within the intensive English program that the school offers.

As I mentioned in previous sections, I took into consideration CLIL approach's fundamentals that, embrace language and content features in a classroom. These are the ones that some dealing authors called the 4C's (see Chapter 2, CLIL section). According to Coyle, Hood & Marsh (2010 p.19), "educational practice always needs to adapt to the cultural demands of those involved – learners, teachers and communities. Integration has become a key concept in the modern age, alongside immediacy of purpose".

In order to provide children with meaningful reading materials I selected and adapted some on line materials trying to engage readers and keep them interested in reading, which is an important fact when thinking about the improvement of reading comprehension abilities such as decoding using grapheme rules, silent reading techniques, skimming, scanning, semantic mapping, guessing, vocabulary analysis, and the distinction between literal and implied meanings which are important to enhance proper levels of reading comprehension.

To select the appropriate on-line material I took into account the age and interests of learners; however, most of the materials were original (designed by the researcher) taking into consideration the same criteria and also, the specific topics of the Science curriculum.

With reference to the specific reading comprehension strategies applicable in this action research project, I considered applying five of the strategies for reading comprehension proposed by Brown (1994), (see chapter 2), as I explained there, they were chosen based on the students' needs reported in the pre focus group session. The activities applied to students were developed having in mind the strategies previously described in Chapter 2. Most of the activities were adapted from what was some proposed by: Coyle, Hood & Marsh, 2010 and Read, 2007.

The specific features of the proposed reading strategies and the intention to use them in a content-based classroom with the purpose of improving intensive reading comprehension performance, if possible, was an aspect I considered as a framework of the pedagogical intervention. For this reason, the connection between the chosen reading strategies and the way to implement them was taken into account in planning.

To accomplish that goal, during the pedagogical intervention I used the ICELT lesson plan template (See appendix F); I adapted this in order to embrace both content and language aspects. The sequence was:

1. **Warm up:** A short activity to motivate children and help building up the topic of the lesson.

2. **Target language and content input:** Topic presentation; short part of the class where the teacher presents important data related to the class (content, language, strategy).

3. **Controlled-guided practice:** activities where the students practiced language, content and reading strategies. The learners gave ideas related to the content of the text, based on the application of the strategy.

4. Independent practice: Stage of the class where the students could interact in pairs to share the content of the text and the workshop related to it.

5. Closing activity: A stage where the students and teacher interacted to share experiences about their learning and advances using the strategy. Some practice was proposed to be done at home.

The following is the time line chart that summarizes the sequence of the application reading strategies as well as the data collection instruments used to gather information.

Table 1. Timeline of the proposed activities

DATE	ACTIVITY	DATA COLLECTION INSTRUMENT
September 3rd-7th	The initial focus groups interview	Pre focus group session and teacher's journal.
September 10th-14th	Application of skimming strategy	Students´artifacts and teacher's journal
September 17th-21st	Reinforcement of skimmimg	Students´artifacts and teacher's journal
September 24th - 28th	Application of scanning strategy.	Students´artifacts and teacher's journal
October 1st – 5th	Reinforcement of scanning	Students´artifacts and teacher's journal
October 16th -19th	Application of semantic mapping strategy.	Students´artifacts and teacher's journal
October 22nd - 26th	Application of guessing the meaning of words strategy	Students´artifacts and teacher's journal
October 29th – November 2nd	Application of vocabulary analysis strategy	Students´artifacts and teacher's journal
November 6th -9th	Closing activity	Post-focus group session and teacher's journal
November 13th – 16th	data and analysis process	Final paper
November 19th – 23rd	data and analysis process	Final paper

Chapter Five: Results and Data Analysis

In the development of this chapter, the author presents the data analysis, systematic series of procedures and techniques used to transform raw data into a more coherent and meaningful information that, according to Corbin and Strauss, (2008), could promote understanding and increase professional knowledge to answer the research question. Also, the chapter presents the implications that the application of reading strategies could have inside of a content-based class that, in fact, works under the perspective of the CLIL approach. The analysis was based on the procedures of grounded theory.

Data Management

To follow the process of collecting data, storing and retrieving information five files were opened in Word documents with the purpose of using them to collect, classify, and store the information.

The first file contained information about data collected during the application of the pre-focus group instrument.

The second file contained information taken from students' artifacts related to their results after the application of each reading strategy.

The third one, contained data taken from students' artifacts, from a specific section of self-evaluation that highlighted the fundamentals of CLIL approach.

The fourth file contained the main insights the researcher collected after the application of each instrument.

And, the last one, contained information related to the results obtained when the post-focus group was applied.

It is important to mention here that all transcripts/samples correspond to pieces of information that the researcher considered important for the development/analysis of results of the research project.

In order to guarantee the confidentiality and anonymity, as two of the most important ethical considerations in a research project, the participants were numbered from 1 to 20. In order to do this, the researcher assigned the letter S (student) followed by a number from 1 to 20.

The instruments were chronologically organized as well as the students' artifacts and numbered according to the strategy. See details in table 1.

All information obtained was transcribed and organized in different charts. (See appendix G and H), and, the information obtained from the pre and focus groups was put in different charts (See appendix I). Finally, they were used to discriminate topics and facilitate the categorization process and the analysis as well.

Procedures for data analysis

The data collected was analyzed in accordance with the procedures proposed in Corbin and Strauss (2008), they argue that "The Grounded Theory is a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon, the research findings constitute a theoretical formulation of the reality under investigation rather that consisting of a set of numbers, or a group of loosely related themes" (p.24).

In sum, the most important characteristics that Grounded Theory offers to researchers are:

- It builds theory rather than only test it.
- Give the research process the rigor necessary to make the theory "good" science.

- Help the analyst to break through the biases and assumptions brought to, and that can develop during, the research process.

- Provide the grounding, build the density, and develop the sensitivity and integration needed to generate a rich, tightly woven, explanatory theory that closely approximates the reality it represents.

To perform the aforementioned functions, the Grounded Theory's first step is to permit the breaking down of big pieces of information into smaller ones; it lets the researcher to go to details. This is called coding, and, as it is mentioned by Corbin and Strauss (2008) "coding represents the operations by which data are broken down, conceptualized, and put back together in new ways. This is the main process by which theories are built from data" (p.57).

Based on Corbin and Strauss (2008), there exist three levels of coding:

- Open Coding: It is the part of the analysis that pertains specifically to naming and categorizing of phenomena through close examination of data. This is possible by fundamentally two activities; the first is making comparisons, the second is asking of questions.
  In the current action research project, the open coding process was applied taking into consideration the information gathered during the application of three research instruments: pre and post focus groups, the teacher's journal and the students' artifacts. Based on the findings, I could establish the research preliminary categories (See table 2).

- Axial Coding: It is a set of procedures whereby data are put back together in new ways after open coding, by making connections between categories.

In the development of this action research project, I applied axial coding with the purpose of establishing connections among the findings obtained from the 3 research instruments. It was possible by a constant process of interpretation and subsequent comparison. (See table 2).

Table 2. Example that demonstrates how the categories and subcategories were established

RESEARCH QUESTION	DATA TAKEN FROM	PRELIMINARY CATEGORIES	CATEGORY1	SUBCATEGORY 1.1 and 1.2
To what extent can the application of reading strategies help seventh graders develop intensive reading comprehension in a content-based science class?	**Pre and post focus group** Yo he podido notar que ahora comprendo más fácil el contenido de un texto aún sin usar el diccionario (S3)	Samples of reading comprehension improvement. Feelings of students regarding their improvement in reading comprehension. Intensive reading comprehension constraints (reported by the students) CLIL aspects that support the awareness of language features. Reported evidence of connections among content and language.	Improvement of intensive reading comprehension in the science classroom	1.1 Advances in reading performance using the reading strategies.
	Teacher´s journal During the application of the "guessing the meaning of the words" strategy, the students are giving evidence of the comprehension of the text. I was monitoring the process and they show clear ideas about the topic.		Improvement of intensive reading comprehension in the science classroom	1.1 Advances in reading performance using the reading strategies.
	Students´artifacts We are adding more processes to separate mixtures, we could include chromatography that is to separate the components of dyes (S3)		Improvement of intensive reading comprehension in the science classroom	1.2 Advances in content understanding

- Selective Coding: In this process, categories are interrelated and integrated and make possible the formulation of a Grounded Theory (Corbin and Strauss,1990). However, as it was seen before, this is a continuous process. Since the two emergent categories appeared to have interrelationship, this conducted to obtain a main category that could include them as well as their subcategories. This was " Improvement of intensive reading comprehension skills in a science (CLIL) classroom by the application of reading strategies"

Data reduction

Researchers must process the information collected with the purpose of breaking it down it into smaller pieces of analysis. According to Corbin and Strauss (2008), "once we have identified particular phenomena in data, we can begin to group our concepts around them. This is done to reduce the number of units with which we have to work"(p.65).

The analysis was done over the students' artifacts and their thoughts when they did their self-evaluation processes. Also, I used both, the pre and post-focus groups in order to compare the initial situation of the students and their final outcomes regarding intensive reading comprehension as well as the teacher´s journal. The emergent information, taken from the three different sources allowed the triangulation process in order to validate the current action research project.

By doing the categorization process, I attempted to identify patterns in data and, in this way, simplify the information (Corbin and Strauss, 2008). Then, I took the information obtained from the pre and post-focus groups, the teacher's journal as well as the students' artifacts and their corresponding self-evaluations and, I grouped the patterns discovered.

Initially, during the open coding process, I took into consideration the information gathered during the application of three research instruments. Based on the findings, I could establish the preliminary categories. They were basically five: samples of reading comprehension improvement, feelings of students regarding their improvement in reading comprehension, intensive reading comprehension constraints (reported by the students), CLIL aspects that support the awareness of language features, and reported evidence of connections among content and language.

After that, I applied the axial coding and determined two basic categories: Improvement of intensive reading comprehension in the science classroom and reflections regarding language focused on reading comprehension. And, at the end, I placed most of the preliminary categories into the subcategories trying to reduce and connect data as much as possible. The information collected from the instruments was triangulated to validate the findings.

Categories

Taking into consideration the focus of this action research project, which is to see the impact of reading strategies (skimming, scanning, semantic mapping, guessing the meaning of the words and, vocabulary analysis) on intensive reading comprehension in the content-based science class, I determined the research question. Based on this, I established the following categories and sub categories.

Table 3. Categories and Subcategories of the Research

Research Question	Categories	Subcategories	CORE CATEGORY
To what extent can the application of reading strategies help seventh graders develop intensive reading comprehension in a content-based science class?	1. Improvement of Intensive reading comprehension in the science classroom	1.1. Advances in reading performance using the reading strategies. 1.2. Advances in content understanding	Improvement of intensive reading comprehension skills in a science (CLIL) classroom by the application of reading strategies
	2. Reflections regarding language focused on reading comprehension	2.1 Students and teacher evaluation regarding CLIL aspects 3Cs (communication, culture, cognition) and their integration during reading in the science context	

Through the analysis of the post-focus group, the teacher's journal, the students' artifacts and their corresponding self-evaluations, two categories emerged. They represent different aspects which are beneficial to improve the intensive reading comprehension inside a content-based classroom.

The first category was called "Improvement of intensive reading comprehension in the science classroom". In this, the interest of the researcher was to show evidence of some levels of improvement of intensive reading comprehension in a science class, in which students have applied some reading

strategies (skimming, scanning, semantic mapping, guessing the meaning of words and, vocabulary analysis) for the analysis of scientific texts.

From this category, two sub categories emerged; each one focuses on the analysis of one important piece of information: the first one was "Advances in reading performance using the reading strategies" and the second was "Advances in content understanding"

The second category was related to the way in which the CLIL approach is showing an important role when students are pledged in the development of intensive reading comprehension's exercises inside the science classroom where, they have to deal with not only content but also language aspects as the same time.

From this, one subcategory emerged called "Students and teacher evaluation regarding CLIL aspects 3Cs (communication, culture, cognition) and their integration during reading in the science context".

Category 1: Improvement of Intensive reading comprehension in the science classroom

This category is supported by the analysis and comparison of the pre and post focus group sessions, the teachers' insights taken from journal's annotations and also, by the students' artifacts that were applied along the pedagogical intervention process.

The students' artifacts gave account of the application of a different reading strategy from the ones I decided to use because both their usefulness in a content-based class and also by the need, reported by students, during the pre-focus group intervention. Also, they were important sources of information regarding the student's performance when applying the reading strategies.

This first category gave support to the research question in the way in which it can explain the need to incorporate both content and language in the dynamic of a content-based lesson, where, there must be a certain level of balance between what is taught (content) and specific language skills that need to be developed to successfully in order to perform in a content-based classroom (reading strategies). To support this idea I chose some excerpts taken from the students' artifacts as well as some insights taken from the teacher's journal:

"Students awareness about language aspects must be developed in any content-based subject. Students need to see the integration of English and content-based subjects. I observed some of them confused because of the type of activity they are doing. It is not clear for them, in relation to the development of this specific activity, what matters to language. They focused their interest only on content. However, it is big deal for them their language decoding process to understand the text" (Teacher's journal, Application of the first strategy-skimming).

"Al aprender nuevas palabras relacionadas con ciencias he podido ver que he mejorado en la comprensión de los textos que hemos trabajado" (S19 Post focus group).

Sub category 1.1. Advances in reading performance using the reading strategies.

Reading is one of the most effective ways for language learners to acquire language skills in context (actually it represents one of the main sources of input). So, appropriate reading comprehension strategies must be included to improve not only reading comprehension, but also writing style, vocabulary, spelling and grammatical development (Krashen, 2004). In the current action research project, the students have shown evidence on the improvement of their intensive reading comprehension by the application of the aforementioned reading strategies (See table 1).

The improvement has been tangible especially in aspects related to identification of specific information, the interpretation of vocabulary in deciphering the meaning of the whole text, identification of main ideas and, going further, the reading pace (time taken to read and comprehend effectively). The latter was, based on the pre-focus group session, another aspect that has had a negative impact on intensive reading comprehension.

The following are some excerpts taken from the instruments applied during the pedagogical intervention:

In this excerpt, the students expressed the advantage of Skimming if the purpose is to get the general ideas of the text, getting apart from interpretation of every single word

"Skimming was interesting because it was easy when we had to read only some parts of the text. We could understand general ideas rather than be worried about single words". (S6 – S19, self – evaluation from the students' artifacts – skimming strategy)

"It is the first session of the application of reading strategies. Students will start the application of Skimming; they seem impatient and worried about the new words, they started to ask me, I advised them to underline the main ideas as I have already explained them the preliminary session (first hour of the application). Now, they are doing that. I started to ask them about general ideas of the text and, showing weaknesses they produced good ideas. I handed out them the workshop and, they seemed more comfortable" ((Teacher's journal, Application of the first strategy-skimming)

Students reported here, that their reading pace was positively affected by the application of the strategy (scanning).

"We think that using scanning is easier than reading in the normal way. We advanced faster".
(S6 – S19, self – evaluation from the students' artifacts – scanning strategy).

"Siento una gran diferencia entre mi nivel y velocidad de comprensión de un texto. Antes me
tomaba mucho tiempo, me aburría y finalmente abandonaba la actividad, ahora no me
preocupo por cada palabra lo que ha hecho que sea más rápida" (S5, post-focus grop)

The students realized the importance of semantic mapping to organize the information in a way that
could be better understood and applied by them in different contexts/moments.

"Using the strategy we could organize the information easier and probably it could help us to
better comprehend the topic or study for an evaluation" (S2 – S16, self – evaluation from the
students' artifacts – semantic mapping strategy).

"After checking the products of the students I could notice that the semantic mapping strategy
is a positive element that facilitated the organization of specific-scientific information. When
students had to decode the textual information and transform it into a graphic, they could
create connection between topics. At the end of the application, students were aware of the
different methods to separate mixtures and the elements required to do this". (Teacher´s
journal, Application of the semantic mapping strategy).

The student demonstrated the impact of the reading strategy on different aspects of the language; in
this case, she reported the improvement of her writing due to the acquisition of more and specific
vocabulary.

Yo considero que las estrategias si me han ayudado porque al investigar nuevas palabras o
adivinar su significado he podido construir párrafos más fácilmente" (S7, post focus group).

In another case, the student reported his advance in the identification of synonyms, antonyms, comparatives and superlative forms.

> *"En el desarrollo de las actividades pude identificar diferentes palabras que actuaban como sinónimos y antónimos de otras palabras que ya conocía. También pude reconocer cómo se escriben las palabras para comparar y resaltar características de las mezclas de las que hablaba el texto" (S9, Vocabulary analysis strategy)*

This student reported that by applying the reading strategies he is able now to mentally construct brief versions of the whole text using its main ideas.

> *Yo pienso que si he mejorado, ya puedo hacer un resumen rápido en mi mente teniendo en cuenta las posibles ideas principales" (S2, post focus group)*

It is a fact that the reading pace is affected by reading comprehension. In this excerpt, the student reported that his current reading pace and reading comprehension have allowed him to increase the amount of material he is able to interpret in a single reading session; the change from 1paragraph to 3 is a big challenge for him.

> *Si he avanzado porque antes sólo leía un párrafo y me cansaba, ahora leo tres seguidos y comprendo" (S5 and S11, post- focus group).*

And, from the researcher's perspective the following excerpt shows evidence of the students' advance in their reading comprehension skills.

> *"It is the session, in which my students applied the fifth strategy (vocabulary analysis). I have seen huge advances in my learners. First of all, they have received the input of this strategy showing expectance. Second, just some of them (2 students) ask for clarification during the*

development of the artifact's activity. They were concentrated in the development of the activity" "When I revised the results of the application of the strategy, it was surprising that most of them got high scores (67%) in average". (Teacher's journal, Application of the fifth strategy-vocabulary analysis)

Analyzing the excerpt, it is important to mention that, on the first hand, the students have demonstrated an advance in their reading comprehension, they have shown better results in the application activity and provided evidence of positive outcomes in reading comprehension. It is especially important because it has a direct incidence in specific science contexts, so, the students are demonstrating advance not only in reading comprehension, but also in understanding science topics.

Furthermore, another piece of evidence that supports the students' improvement was based on a systematic register of their performance in the development of each reading strategy's task. The chart used to gather the information related to the students' performance throughout the complete pedagogical intervention was adapted from Anderson, (2002). A model of it will appear below:

Table 4. A sample of the chart used to collect information regarding students' performance after the application of each reading strategy

Reading strategy ⬇   Students' performance (%) ⬇

Strategy Score	Skimming S5 – S14	Scanning	Semantic Mapping	Guessing	Vocabulary Analysis	%	
0						0	← WORST
1						14	
2						29	
3						43	
4						57	
5			x			71	
6	x	x		x	x	86	
7						100	← BEST

← Right answers

At this point, it is important to compare these findings with the initial situation of the learners (See needs analysis section).

The chart above (table 4), belonged to students 5 and 14. The chart shows in the first row the name of all 5 strategies the students used along the pedagogical intervention. The first column shows numbers from 1 to 7. The numbers inform about the level of performance reached by students using each particular reading strategy being 1, the case of the worst performance and 7, the best. To do this, it was necessary to propose in the students' artifacts the development of the same number of reading comprehension' application activities (See part C of a students' artifact in appendix J). The level of performance was based on the successful completion of the application activities proposed at the end of each student's artifact.

Even when the purpose of the researcher is not to quantitatively analyze data, the chart above shows how the proposed strategies helped the students to improve their intensive reading comprehension. It was the case of students 5 and 14; they expressed during the pre-focus group session, that they dislike reading in English no matter the context, because they usually had to repeat the reading process no less than three times in order to get the main ideas of the text and, more times if they had to answer specific questions about the content of the text.

In contrast, at the end of the pedagogical intervention, they were able to identify principal and secondary ideas, to guess the meaning of most of the unknown words and to use specific scientific vocabulary, related to the reading passages, to communicate with their classmates in the context of the topic "mixtures".

Based on the last assertion students 5 and 14 said:

Excerpts were taken from the self – evaluation section of the students 5 and 14' artifacts

"From the reading we learned how to comprehend and organize the ideas expressed in a text"
(semantic mapping strategy)

"From the reading we learned new words like cellulose, busy, few, bottom that in science have
different meanings" (scanning strategy)

" By using the reading strategy, we could identify no less than three pairs of synonyms"
(vocabulary analysis strategy).

"By using this reading strategy, we were able to identify the main and secondary ideas of a
scientific text now" (skimming strategy).

As a consequence, students 5 and 14, who disliked reading in any context (information taken from the
pre focus session), now are reporting success in their reading tasks. They followed a sequential and
growing process in the identification of language features that make possible the identification of the
general meaning of the text as well as the observation of specific details. The same happens with
almost all pairs of students.

This is similar to what Brown (1994) has described. He stated that reading comprehension
involves a "psycholinguistic game" where the reader must first recognize a multiplicity of linguistic
signals such as letter, syllables, etc, and then, use the linguistic data processing mechanisms to impose
some sort of order to these signals; throughout this permanent process, the reader must infer meanings,
decide what to retain and not to retain in a long and cyclic scheme. And, in this psycholinguistic game,
the reading strategies play an important role; according to Jimenez (2000), they enhance proper levels
of reading comprehension.

As a conclusion of this piece of analysis, the students showed evidence of both, the understanding of the text/topic and the learning of language features that constitute the two main basis of intensive reading comprehension (Nunan, 1999).

Sub category 1.2. Advances in content understanding

In a normal content-based classroom, attention is put most of the times over the content. This is seen in an isolated manner. However, and based on the CLIL fundamentals it is known that a student could be guided to more complex thinking skills, the ones that will allow him/her to join the pieces of the curricular puzzle with the purpose of giving more sense to his/her learning process.

So, reading comprehension in a CLIL classroom must facilitate the understanding and the life-long learning of specific topics that could help the student to use them when necessary to solve academic/personal problematic situations.

This subcategory centers the attention on the close relationship that exists between the reading comprehension issues and the incidence they have in the comprehension of specific science topics.

The following are excerpts taken from the different instruments used to collect data:

"Ya he comprendido mejor el tema y estoy aplicando las estrategias en otras clases también" *(S9, post focus group)*

"Las estrategias me han ayudado en ciencias, ya no me parece tan aburrido leer para esta materia porque comprendo en gran medida lo que leo y en más corto tiempo. Las estrategias también me han ayudado en lenguaje y el lenguaje es importante para casi todas las materias" *(S20, post focus group)*

"Having into consideration my observations, I have noticed that a great number of students, of the 20 participants, have improved the comprehension of the topic "mixtures", before the pedagogical intervention they do not know/apply any reading strategy, now, they help them to advance in the specific content, especially (S17), at the beginning of the pedagogical intervention, during the pre-focus group session, she expressed that the permanent failure not only in science but in all content-based subjects was due to her negative attitude towards reading input, moreover if it is English. Now, she said (during the post focus group session), she felt proud because of her good performance in the proposed reading tasks". (Teacher's journal, the post-focus session).

Based on student 17 opinion and giving support to what she said about her improvement on reading comprehension tasks after the pedagogical intervention, the researcher is presenting her register's chart. In this, she and her partner got 88% of successful performance in reading comprehension and its application in the development of specific tasks proposed in their constructs.

Table 5. Performance´s register of students 1 and 17 after the application of reading strategies

Strategy Score	Skimming Student 1 and Student 17	Scanning	Semantic Mapping	Guessing	Vocabulary	%
0						0
1						14
2						29
3						43
4						57
5						71
6	x		x	x	x	86
7		x				100

I

n addition, one of the students said, during the post focus group session, that she felt that the strategies have helped them (she and her partner) to improve the understanding / comprehension of the content itself. In regards to this aspect, the student said:

"Siento que las estrategias me han ayudado a mejorar en esta materia" (S17, post focus).

In order to give more support of the students' performance (S1 and S17) in both the application of the reading strategy and their content improvement (see appendix K), which gives account of the students' progression in both content and language

In the same way, students 3 and 10 reported that they feel more comfortable when they know about reading strategies that help them to understand a topic, they said:

"*When we could apply this or another strategy we have certain good sensation because, in some way, we know that we are going to succeed in the subject" (S3-S10, Vocabulary analysis strategy, self-evaluation section)*

It is also remarkable to notice what the students progressively did that demonstrated their improvement in both content and language. See the following example based on the participation of the students 1 and 17. (Strategies appear in the same chronological order in which they were applied)

S1 and S17	
CONTENT	LANGUAGE
Skimming: Nothing new	**Skimming:** How to read a text
Scanning: Gravity helps separating mixtures	**Scanning:** New words like cellulose, busy, few, bottom, in science they can have different meaning
Semantic Mapping: Two new ways to separate mixtures	**Semantic Mapping:** How to comprehend and organize the ideas from a scientific text. We could use it in different classes
Guessing the meaning: Some separation of mixtures processes	**Guessing the meaning:** New words based on the context of the text, we did not use the dictionary!

From the previous chart, it is possible to see how the students (S1 and S17), developed reading comprehension proficiency gradually being aware of both content and language aspects at the same time. Notice that in the same way they advanced in the application of the different reading strategies, they were doing deeper observation of the text. This has been a big challenge to notice the way in which students, by peer interaction, could share knowledge and, construct knowledge by themselves (Coyle, Hood & Marsh, 2010).

Category 2: Reflections regarding language focused on reading comprehension

This category is supported by the analysis of a specific section in each artifact, this was the self-evaluation; this allowed learners to think and analyze themselves in the context of a content-based class trying to carry out a language task focused on the reading comprehension processes. Moreover,

trying to get detailed information from a specific text; tasks that demand not only cognitive abilities but also, meta cognitive functions.

In this dynamic, the inclusion of the CLIL approach, that has been considered a dual-focused education pattern, is extremely important. This is due to the fact that some relationships can be established among the specific subject and the language itself (McDougald, 2009).

In a science classroom, children are exposed to high levels of reading input. In most of the cases, it is expected that they read no less than 6 pages of a Science book (approximately 2000 words) in 50 minutes. This with the purpose of getting some general ideas about a specific topic but, in most of the cases, this results in being discouraging and boring for them, especially, because they have problems in the identification and interpretation of new vocabulary, organization and selection of main and secondary ideas, in other words, they lack of reading strategies.

According to Mehisto, Marsh, and Frigols (2008) the language requirements in a content-based class must include technical vocabulary, special expressions, multiple meaning of words, syntactical features and language functions which predominate in a particular content area of a lesson (informing, defining, analyzing, classifying, predicting, inferring, explaining, justifying). All of these cognitive and language abilities, can be developed and improved while advancing in reading comprehension and enhanced with the practice of student-centered interactions making possible cooperative work, focused on problem-solving activities that can be particularly useful.

Sub category 2.1. Students and teacher evaluation regarding CLIL aspects 3Cs (communication, culture, cognition) and their integration during reading in the science context

Based on what was expressed by Mehisto, Marsh and Frigols (2008) in a CLIL content based class, learners need to be conscious of what is expected from them in terms of both language and content;

language is used to learn as well as to communicate; the subject matter determines the language needed to be learned. Also, the students must show advance in all of the 4C's. In this sub category, I made reference to communication, cognition, and culture. Content was the matter of the subcategory 1.2. Regarding the remaining 3Cs, it is expected that students show evidence of:

- Communication: Using language to learn while learning to use language

- Cognition: Developing thinking skills which link concept formation, understanding, and language.

- Culture: Exposure to alternative perspectives and shared understandings.

The students have shown evidence of the benefits to integrate content and language not only in the science classroom, but also in all content-based areas.

The following are some excerpts taken from the applied instruments:

In this first sample, the student is giving evidence of the importance of joining knowledge of different areas with the purpose to make it cross-curricular and "universal".

"Relacionar aspectos del lenguaje con los de ciencias es importante porque al entender cómo se aplica una estrategia de lectura para entender un texto de ciencias, también ya será más fácil aplicarlo a otra materia. A mí me ha pasado en Informática, el profe nos pone a leer acerca de varios temas y ahora puedo aplicar los métodos de lectura que he aprendido en ciencias" (S9, post focus group).

In the second sample, the students are expressing their ideas about communication issues they required to generate communication and agreement.

"We feel a need to communicate each other, our strategy was to produce and solve questions related to the text" (S5-S14, self-evaluation section of students' artifacts, skimming).

In this third sample, the student made reference to some thinking skills she has developed and the ones she considered are the ones that explain her advance.

" Al hacer la integración de ciencias y cosas del inglés, he notado como mi proceso de lectura ha mejorado; he podido construir resúmenes desde las ideas principales que obtengo de skimming y a tener en cuenta el vocabulario específico que recojo cuando hago scanning, esto me ha ayudado a avanzar en la comprensión de los temas de ciencias" (S1, post focus).

Now, based on the researcher's perspective, the development of cognitive, communicative and cultural skills embraced a general improvement of the students' performance in reading comprehension.

"In this closure activity I could mention that the students have advanced not only in Science topics but also in their language. However, what is more important is that they acquired significant communicative elements that have allowed them to interact with their peers, to negotiate several situations related to their personal and academic environments, to construct ideas and probably concepts sing their own tools and based on prior experiences that have came from their particular contexts" (Teacher´s journal, post-focus group session).

The aforementioned samples give account of the inclusion of the culture, communication, and cognition elements that have emerged during the pedagogical intervention. They represent aspects of high-level of importance due to the frequency in which students have reported on them.

Based on the researcher's point of view, the following is an excerpt where there is evidence of the dynamic where the 3Cs are incorporated in the science class.

"It was the day of the application of the third reading strategy (semantic mapping); doing the activity the students started to establish connections in two ways. For example, the students 2 and 16, started to confront the ideas they have interpreted from the text – here, items related to communication were necessary-. Student 16 initiates a kind of "negotiation of the meaning", trying to establish a common final conclusion, finally, it was reached; here, the connection was established between the ideas they had regarding the particular information they found in the text – cognitive elements were required-. The second way to establish connections they use was taking into account previous knowledge – where cultural aspects are taking into account - . It was seen in students 3 and 10. Student 3 started the conversation by mentioning a laboratory practice they had the last year, in this, he mentioned that he could experience what density is; the two students remembered the experience and based on it and the information available in the reading passage they could complete their work" (Teacher's journal, Application of semantic mapping strategy).

Taking into consideration the situations I expressed in the journal, the students made use of lower and higher-order thinking skills (cognition); they use the English language to establish communication with their peers and to negotiate the meaning (communication) and, establish relationships between previous experiences that, in general, constitute one of the basis of micro cultural aspects.

This chapter showed the main findings of the current action research project. I supported them with concise evidence of the students' performance. The next chapter offers the main conclusions obtained in regards of the solution of the research question and the general objective of it.

Chapter Six: Conclusions and Pedagogical Implications

This chapter presents the findings of the study carried out with 20 students from a secondary school in Bogotá, Colombia in relation to the improvement of their ability to read comprehensively in a Science classroom through the application of some reading strategies. Furthermore, the limitations encountered throughout the implementation phase and the recommendations for further pedagogical and research practices are also presented.

Taking into account the research question, to what extent can the application of reading strategies help seventh graders develop intensive reading comprehension in a content-based science class, I can assert that the target group of students have improved their ability to read and comprehend specific texts which constitute important input sources in the context of a science class. According to García (2008), the strategies applied were chosen taking into account the information taken from the pre-focus intervention session (students' needs). In that way learners felt active participants of the entire process, they felt that their voices were heard and, thus motivation was enhanced.

It is also important to mention here, that the students developed not only appropriate intensive reading comprehension skills in the context of the science class but also, they could improve in other language dimensions that were not considered at the beginning of this research experience. For example and based on the findings, by reading, the students could improve the identification of language features like verbs and adjectives, technical vocabulary, semantic meaning and its variations according to the scientific context, grammar tenses' structures as well as synonyms and antonyms (See excerpts shown in subcategory 1.1). This idea is supported by Bogoyá (2010), in her study she argues

that language improvement is derived from content-driven classes where language strategies have been incorporated.

CLIL approach helped reach the goal of the research project in the way it embraces content and language aspects that were considered in the development of the students' artifacts templates and also in the dynamic of each session of pedagogical intervention. Thus, some aspects highlighted by the CLIL approach were reckoned on. For example, the researcher offered the possibility for students to work and interact with their peers in order to enhance communicative and life skills. The tasks were developed taking into consideration language aspects (reading strategies, pre-while-post approach to readings) and also content-based aspects (the topic of the reading and the subsequent process of self-evaluation). As a consequence, the students perceived a connection between content and language that facilitated their advance in both of them.

I emphasize and point out the importance of the application of the CLIL approach inside the context of content-based classes as an important element were content and language constitute the framework for the construction of meaningful knowledge of learners of this and future generations. Based on the research findings, the application of CLIL fundamentals inside the Science classroom has demonstrated the students' progress in both content and language (specifically, intensive reading comprehension). At the end of the pedagogical implementation and according to Marsh (2000) it was seen that students were able to internalize and retain more information related to science issues, more specifically, about the kinds of mixtures and the mechanisms to separate them. As a consequence their performance in the proposed tasks was better.

Another positive aspect to be mentioned in relation to CLIL fundamentals was the distribution of students in the classroom; they were organized in pairs, having the opportunity to share with each other. According to Coyle, Hood & Marsh (2010), the purpose to generate an interactive classroom is

to facilitate opportunities for group work where, students are permanently questioning and solving situations, working cooperatively to make use on the other's areas of strength and compensate for weaknesses. In this way, and according to Lier (1996), cited by Coyle, Hood & Marsh (2010), the students developed life skills such dealing with the unexpected, observational skills, and constructing knowledge which is built on their interaction with the world, yet purposefully guided by values and convictions.

As a consequence, the students have also improved in their autonomy and their ability to communicate each other (two of the main purposes of the CLIL approach). I reported that, in the last intervention session, only two students had to look for the help of the teacher, situation that can be contrasted with the one reported during the pre-focus. In this, the students were teacher-dependent and look for her help as their unique "reading strategy". By working with a partner, students could negotiate and consolidate their own conceptual aspects. In the words of Yang (2012), "In order to be an independent reader, it is necessary to develop learning strategies that could help learners to assimilate new information into their existing schemata, which then enrich it to more complex schemata".

It was a contrasting situation that I observed when the data was compared from the pre and post-focus group sessions. In the first one, students reported several aspects that were making their performance difficult in reading comprehension. For example, most of them said that the first-hand strategy they had used was the use of dictionary. So, one of the most successful strategies for them was the "guessing the meaning of the words strategy" that in fact represents a cognitive strategy (Yang, 2012). At the end of the process, they felt so proud of this and were able to make inferences and to recognize the meaning of a word without the use of the dictionary.

In summary, the uses of the five reading strategies were useful elements to improve reading comprehension of students of seventh level inside a science class. Reading strategies constituted first-

hand tools used by students to interpret, analyze and decode information. At the beginning of the implementation it was a challenge for them, however, at the end, they used them even in different academic scenarios. Some students reported that they use the strategies even in Spanish classes.

Based on the conclusions reached that showed the impact of reading strategies in the improvement of seventh grade students' intensive reading comprehension, the following section addresses some pedagogical implications of this study taking into account the importance of reading comprehension experiences inside a content-based classroom.

Pedagogical Implications

First of all and based on the findings obtained from the pedagogical intervention, it is necessary to provide students with reading comprehension strategies that allow them to improve the pace (time taken to read comprehensively) and the analysis of reading material, not only in the science class but also as a cross-curricular element that permit the integration of knowledge as a whole unit.

It is important to always take into consideration the students' previous knowledge. The students interpret what they have read in terms of what they already know, and integrate what they already know with the content of what they are reading; their knowledge and expectations about the world will strongly affect the ability to understand new information by providing a framework within which that new information might fit. In this process, it is important to design materials that could be better used and understood. To do this, it might help the use of authentic material that takes into consideration the students' needs in terms of their English level and age.

In regards to the attitude of students toward reading, at the beginning of the pedagogical intervention they reported that reading was one of the most boring and tedious tasks in the classroom.

Based on that and according to Dekeyser and Spalski (2001), teachers and parents have the responsibility to provide meaningful reading material such as novels for young people, and comic strips between others. This might permit to construct a close relationship between exposure of learners to input practice and better performance in comprehension tasks.

In order to integrate content and language inside the Science classroom it is necessary for the inclusion of some language elements; one of them, reading comprehension experiences that, for this particular action research project, were based on the application of five different reading strategies which can support the development of intensive reading comprehension skills in a specific science context.

Another aspect that English and content-based teachers must consider is the possible implications/limitations that could be shown when students use the dictionary. It could be a good tool to enrich vocabulary but this has a negative effect on the reading comprehension pace and on motivation. Most of the time students become frustrated when they cannot find the word or, when they find it but it has two or more different meanings according to the context and, as a consequence, they decide to give up any effort to understand a written text.

Finally and based on the improvement in intensive reading comprehension that the target group of students has shown due to the inclusion of language and content elements in a science classroom, the researcher recommends the use of the CLIL lesson plan's template; it helps the teacher to guide the lessons in the directions of the 4C's that constitute the strong points of the CLIL approach.

Limitations of the Study and Further Research

Limitations presented in this study are mentioned below as a way to be considered in the case that teachers want to apply this study in their educational context.

One aspect the researcher considers important to mention was the school's support. Despite the fact that the project itself was well accepted in the academic community, some constraints appeared in the road. For example, the unexpected adjustments the researcher had to do to match the thematic of the reading passages to the new structure of the topics in the current Science Area Program, thus the work the researcher had developed previously did not fulfill the requirements of the current academic year in terms of content. This is a problem especially for those schools that work in Calendar B (schools that initiate the academic year in August and end in June).

Also, time was a big limitation because there were few classes to follow, observe and analyze the particular advances in students' intensive reading comprehension; the schedule in the school did not allow this specific work, so the researcher had to use extra time in order to listen to the participants' impressions and comments in their process for collecting specific data. There were also extracurricular activities which interfered with the schedule.

In spite of the democratic nature and motivation shown by participants in an action research project, some students' low represented a limitation in the implementation of this study due to the fact that some of them, due to their age, used to doing activities by the reward a grade can offer them, not just to learn with the activity.

Suggestions for Further Research

After the pedagogical intervention of the current research project, the researcher has identified some fields of study that deserve special attention, especially for content-based area's teaching practice.

One of them is to do research on the development of language skills in content-based classrooms where, CLIL fundamentals are considered, the students could progress in content but also in language

aspects. Up to now, most of the research is referred to the theoretical fundamentals of this approach but, does not show evidence of specific aspects of language skills.

Besides, it is recommended exploring other different reading strategies that could be applicable at different levels of the students' academic life. For example, it could be enriching trying the analysis of reading comprehension aspects in content-based classes at pre-school level.

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APPENDIXES

Appendix A. Parents´ consent letter

Colegio San Bartolomé La Merced

Formato de Autorización – Padres de Familia

Bogotá,D.C, Septiembre 17 de 2011

Proyecto de Educación: Desarrollo de habilidades lectoras en el ámbito de la clase de ciencias naturales a través de la implementación de la metodología CLIL.

Maestría en Didáctica del Inglés en Ambientes de Aprendizaje Autónomo

Señores Padres de Familia – Estudiantes Séptimo Grado

Ciudad

Respetados Padres de Familia:

Con el deseo de contribuir al desarrollo de la comprensión lectora en inglés en el área de ciencias naturales, se pretende desarrollar un proyecto educativo llamado Desarrollo de habilidades lectoras en el ámbito de la clase de ciencias naturales a través de la implementación de la metodología CLIL. Trabajo que tiene como objetivo, el diseño de actividades de comprensión lectora individuales, dirigidas a afianzar y brindar elementos desde la perspectiva de la metodología CLIL.

Para este propósito se llevarán a cabo actividades de comprensión lectora en las horas de clase y horas de estudio durante las cuales los estudiantes participarán activa y voluntariamente y su profesor guiará el proceso. Para hacer el seguimiento del desarrollo de este proyecto se realizarán algunas grabaciones, las cuales servirán de soporte para analizar la participación y desarrollo de la habilidad de comprensión lectora de los estudiantes.

 A los participantes se les garantiza estricta confidencialidad con la información que se obtenga. Este proyecto no tendrá incidencia alguna en las notas correspondientes al curso.

Para que quede constancia del conocimiento de ésta información y la aprobación de la participación de su hijo (a), por favor firmar el presente consentimiento.

_____

      Nombre Estudiante

_____   _____

Firma padre   **Firma madre**

SI   ____   **NO**   ____

Appendix B. Students´ consent letter

Colegio San Bartolomé La Merced

Formato de Autorización –Estudiantes

Bogotá, D.C. Septiembre 17 de 2011

Proyecto de Educación: Desarrollo de habilidades lectoras en el ámbito de la clase de ciencias naturales a través de la implementación de la metodología CLIL.

Maestría en Didáctica del Inglés en Ambientes de Aprendizaje Autónomo

Estudiantes Séptimo Grado

Ciudad

Apreciados Estudiantes:

Como es de su conocimiento, en el área de Ciencias Naturales estamos interesados en que los estudiantes mejoren su habilidad de comunicarse en inglés, uno de estos pasos es el de mejorar la comprensión de textos, por ésta razón se desarrollará un proyecto educativo llamado "Mejoramiento de las comprensión de lectura intensiva en la clase de ciencias naturales", con el propósito de diseñar actividades de comprensión lectora para ser realizadas a través de trabajo individual y así contribuir al progreso de esta habilidad.

Para este propósito se llevarán a cabo actividades de comprensión lectora en las horas de clase y horas de estudio en los que ustedes participarán activa y voluntariamente y su profesor guiará el proceso. Para hacer el seguimiento del desarrollo de éste proyecto se realizarán algunas grabaciones, las cuales servirán de soporte para analizar su participación en los talleres y el desarrollo de su habilidad de comprensión lectora.

A los participantes se les garantiza estricta confidencialidad con la información que se obtenga y este proyecto no tendrá incidencia alguna en las notas correspondientes al curso.

Como constancia que conocen esta información y la aprueban, por favor firmar el presente consentimiento.

Nombre _____

Appendix C. Teacher's journal
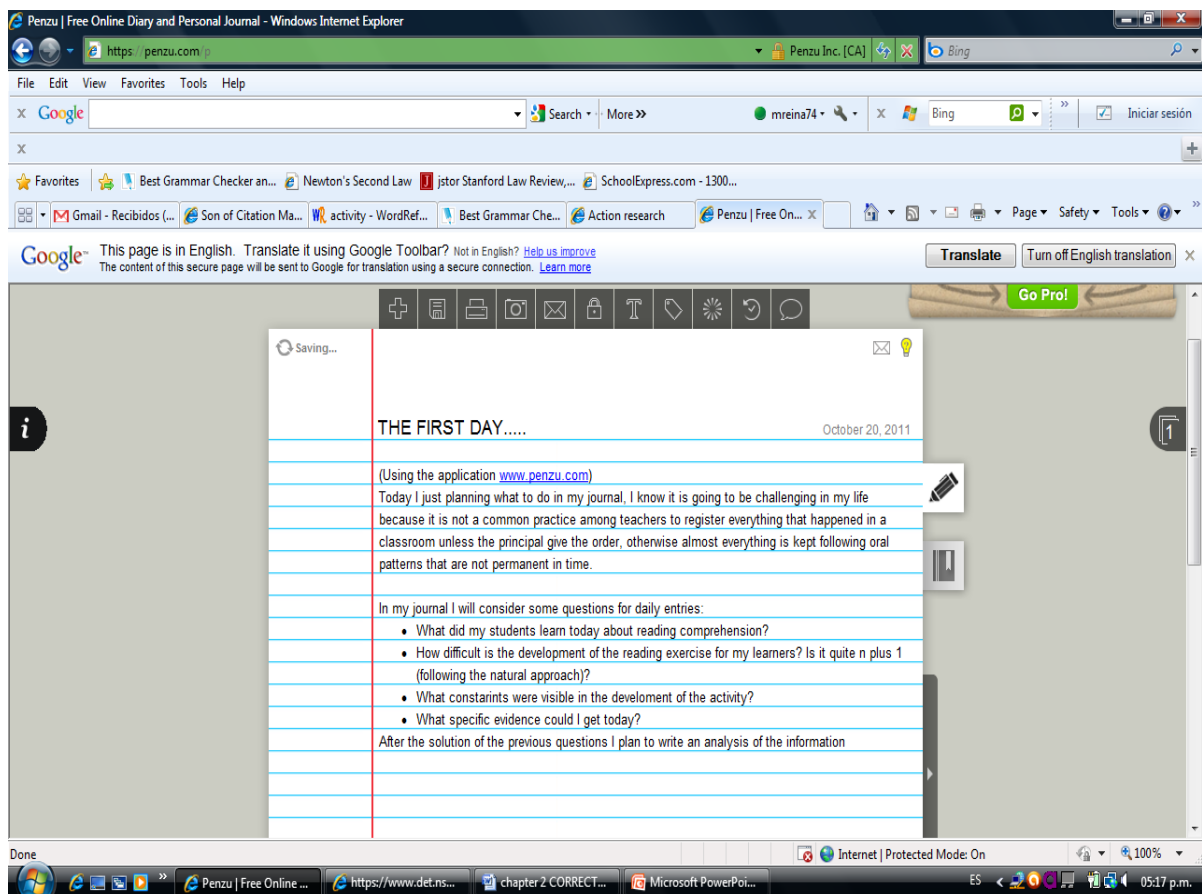
Appendix D. Focus groups (Pre and post intervention)

PRE INTERVENTION

Do you like reading in the science class?

What are the main problems you have had when reading a scientific text?

What strategy if one, do you apply when you have to read a scientific text?

When reading a scientific text, do you do relationships between science and language? Do you identify verbs, adverbs, nouns, adjectives, etc?

POST INTERVENTION

1. How do you feel now when you have to read a scientific text?

2. Have you adopted any strategy to understand what you are reading? If yes, Why is it useful for you?

3. Do you think that your intensive reading comprehension has been improved? Why

4. If you compare your reading comprehension performance before and after, do you notice a difference? If yes, mention one at least.

Appendix E. Research Project Timeline for Activities

Activity/Date	Month September				Month October				Month November				Month December			
	Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4	Week 1	Week 2	Week 3	Week 4
Step 1: Initiation	■															
Step2: Preliminary investigation		■														
Step3 Literature review			■	■	■	■	■	■	■	■	■	■	■	■	■	■
Step 4 Action plan				■												
Step 5 Implementation				■	■	■	■	■	■	■	■	■	■			
Step 6 Monitoring data collection				■	■	■	■	■	■	■	■	■	■			
Step 7 Analysis of data					■	■	■	■	■	■	■	■	■	■		
Step 8 Sharing findings															■	■

Appendix F. ICELT lesson plan template

Main Aim(s):

The student will be able to construct and communicate his/her own ideas related to kinds of mixtures as well as methods to separate them to demonstrate reading comprehension abilities, giving evidence of appropriate understanding of the topic by means of communicative skills through reading comprehension.

Subsidiary Aims:

The student will discuss about his/her previous knowledge about mixtures.

The student will review important vocabulary related to the mixtures and methods to separate them and use it to communicate.

The student will organize information to establish patterns of classification of ideas about mixtures and methods to separate them in order to improve intensive reading comprehension.

The student will communicate with his/her peers in the context of the specific topic.

The student will apply reading strategies in order to improve the reading comprehension skills in a scientific context.

Personal aims:

To provide accurate and clear instructions.

To enhance communicative skills in the classroom.

To encourage student-student pattern of interaction.

To promote cooperative learning.

To provide reading strategies to promote better comprehension of a scientific text

Note: All aims are to be written as performance-based objectives, which go from covert to overt behaviours (See Wenning, 2008)

Assumed knowledge:

The students of this group have acquired communicative elements in the context of a content- based class that have strengthen speaking and reading comprehension on the basis of a scientific context. In a class they usually practice using specific vocabulary, and use it to communicate between peers developing different types of activities where they can put into practice communicative skills as well as scientific elements in order to construct and communicate ideas about the three laws of motion proposed by Isaac Newton.

Description of language item / skill(s)

To read and write in a second language require a set of cognitive elements. In intensive reading the students will set and arrange information into some proposed items that might help them to obtain general ideas about a text. According to Coyle, Hood & Marsh (2010) argue that effective learning cannot take place without active involvement of language and thinking. When learners are encouraged to articulate their understanding, then a deeper level of learning takes place

<u>Form</u>

Because it is a content- based class, I will not consider this aspect. However, when monitoring I will help students in this issue.

<u>Use</u>

As a communicative tool allowing interaction between the students, they will use different forms of tenses and content – based vocabulary

<u>Skill(s) and sub skill(s)</u>

Speaking

Reading

Writing

Listening

The development of these skills is going to be supported by the proposed activities

Guided conversation towards each activity, its instructions and development. It requires peer-interaction and teacher-student interaction.

Classification and arrangement of information from a text; it involves speaking, peer interaction, and meta cognitive elements that involve intensive reading abilities..

Self, peer and teacher monitoring.

(For CLIL) <u>Content Communication Cognition Culture</u>

Content: To reinforce the concepts of mixtures and methods to separate them.

Communication: To develop communicative skills through reading comprehension activities.

Cognition: To categorize, classify and evaluate information taken from a written text

Culture: To enhance communication based on mixtures and oil spills which constitute a concern worldwide.

To create a scenario where learners could be encouraged to articulate their understanding joining both language features and science, fundamentally the mixtures and methods to separate them that give support to main events inside the human body, that in fact, is considered the principle of human homeostasis.

Appendix G.A sample of the chart used to collect the information taken from the students' performance after the application of each reading strategy

Strategy Score	Skimming S5 – S14	Scanning	Semantic Mapping	Guessing	Vocabulary	%
0						0
1						14
2						29
3						43
4						57
5			x			71
6	x	x		x	x	86
7						100

Appendix H. A sample of the chart used to collect the information taken from the students' self-evaluation from the students' artifacts after the application of each reading strategy

For Semantic Mapping

S6 – S19We learned about methods to separate mixtures
S14 – S5 Two new ways to separate mixtures
S2 – S16 We learned some new uses to separate mixtures
S8 – S15We learned that there are a lot more mixtures than we have thought
S7 – S20 We learned the different ways to separate mixtures
S12 – S18 We learned that they work (separation methods) for separating many things
S4 – S13 We learned a lot in a short example. We have not knew about fractional distillation
S1 – S17 We learned that using the correct method we can separate everything
S9 – S11 Nothing
S3 – S10 New techniques to separate mixtures

Appendix I. Sample of the way in which information taken from post focus group was organized (This was for the question 1)

¿Cómo te sientes ahora cuando tienes que leer un texto científico como los que hemos leído de mezclas y métodos de separación de mezclas?

S7: Me siento un poco confundida, porque la primera palabra que trataban de explicar estaba en inglés y la explicación en español, así que es un poco confuso

S12: Yo no necesito gastar tiempo de más leyendo el largo texto, ya que ahora puedo resumirlo

S16: Entiendo un poco más porque es más comprensible

S2: Siento como si hubiera evolucionado en mi método de aprender

S19: Pues me siento descubriendo muchas nuevas cosas porque voy teniendo más conocimiento y aprendo más cosas. Aunque también aprendo me parece a veces complicado

S13: Pues me resulta algo indiferente

S8: Me siento como cuando uno aprende un tema y se siente orgulloso de lograrlo

S11: Yo me he sentido muy bien porque cada vez que tenemos clase aprendo mucho y a medida que entiendo más también comprendo más

S1: Yo me he sentido bien y mal porque ahora se me facilita más el leer concentrada rápidamente pero aún se me dificulta el entender el vocabulario desconocido al leer un texto

S3: Me siento bien porque todo lo que dice, lo se ahora

S10: Pues me sentí un poco confuso porque había muchas palabras que no entendía y que no sabía

S4: Yo me siento normal pues los textos son interesantes y pues aprendo mucho de ellos

S5: No me siento muy raro porque el año pasado también leíamos textos y el tema no esta tan difícil

S20: Aliviada porque sé que voy a entender mejor el texto para responder las preguntas propuestas y se que me va a ir mejor debido a la comprensión de un texto

S17: Entiendo un poco más el tema

S15: En algunas me pareció muy buenas, pero algunas confusas y las podré utilizar para entender mejor

S9: Siento que es más fácil informarme de los temas hablados

S6: Se siente común y corriente, pero al leer uno se siente más profesional por los conocimientos de lectura

S14: Aburrido

S18: Un poco mejor porque ahora no sólo en naturales utilizo este tipo de cosas, y las que más uso son skimming y guessing the meaning of the words

Appendix J. Sample of a complete students' artifact, showing the sections of pre and post reading.

INSTRUMENT 2

SCANNING STRATEGY

Scanning is used to find certain information; in this case we move our eyes very quickly across the text. When we "scan" like this, we do not read every word, or stop when see a word we do not know; instead, we read quickly, stopping only to find the information we need

STUDENT'S NAME _____

How much do you know about mixtures? Circle the answer that you consider is the more appropriate

Sand into a glass of water is an example of **mixture/compound**

By **filtration/evaporation** you can get apart the sand from the water

When we mix two liquids, the resulting product can be called a **compound/solution**

ACTIVITY PART A: Scan the reading to check your answers to the mixtures' quiz above. How many did you get right?

ACTIVITY PART B: Read the passage again, then answer the questions that follow

Mixtures are Everywhere

There are an infinite number of mixtures. Anything you can combine is a mixture. Think of everything you eat. Just think about how many cakes there are. Each of those cakes is made up of a different mixture of ingredients. Even the wood in your pencil is considered a mixture. There is the basic cellulose of the wood, but there are also thousands of other compounds in that pencil. Solutions are also mixtures, but all of the molecules are evenly spread out through the system. They are called homogenous mixtures.

IN A MIXTURE OF SALT AND IRON, THE IRON CAN BE REMOVED WITH A MAGNET.

If you put sand into a glass of water, it is considered to be a mixture. You can always tell a mixture, because each of the substances can be separated from the group in different physical ways. You can always get the sand out of the water by filtering the water away. If you were busy, you could just leave the sand and water mixture alone for a few minutes. Sometimes mixtures separate on their own. When you come back, you will find that all of the sand has sunk to the bottom. Gravity was helping you with the separation. Don't forget that a mixture can also be made of two liquids. Even something as simple as oil and water is a mixture.

Text taken from: http://www.chem4kids.com/files/matter_mixture.html

ACTIVITY PART C: According to the reading.

Decide if the following statements about the reading are true(T) or false (F).

STATEMENT	TRUE	FALSE
Sand and water can be considered an example of a mixture		
Mixtures are considered all possible combinations of matter		
One of the components of wood is cellulose		
Solutions can be considered a special kind of compound		
Gravity is not related to with separation		
Two liquids can form a solution		
Filtering is a process to separate liquids of different density		

SELF-EVALUATION

Base your opinions on the strategy you used to read the passage (Skimming)

What did you learn about mixtures?

_____

What did you learn about language (verbs, adjectives, tenses, etc)?

_____

How could you get the answers to part C?

_____

Was this strategy (scanning) helpful to accomplish this task?

_____

What did you need to communicate with your partner? (Ask questions, explain something, etc)

_____

THANKS FOR YOUR TIME AND YOUR HARD-WORKING ATTITUDE!!!

Image taken from: http://blogs.up.ac.za/jcp2011/index.php?blog=368

Appendix K. A sample of the good performance shown by students 1 and 17 after the application of the strategy "guessing the meaning of words

It is used to separate an insoluble solid from a liquid. The solid remains in the filter paper and the liquid **goes through** the paper into the beaker.

Paragraph 7
Some of the example mixtures that can be separated using the above mentioned techniques:
(1) Separating dyes in inks, or chlorophyll in plants (ethanol as solvent) -> *fractional distillation*
(2) Separating sand from water -> *filtration*
(3) Separating ethanol and water-> *distillation*
(4) Separating water from ink -> *chromatography*
(5) Separating salt from water -> ~~distillation~~ *evaporation*

Information taken from: http://www.scribd.com/doc/6842207/Methods-of-separating-mixtures

Images taken from: http://service.columbia.k12.mo.us/vphillips/science/

ACTIVITY PART C: According to the reading, answer the following questions

1. Based on paragraph 1, what would be a synonym for the word **constituent**?
   a. Component   c. Combination
   b. Structure   d. Complex structure
2. Based on paragraph 2, you could replace the word **dyes** by:
   a. Chemical components   c. Colorants
   b. Arrows   d. Melted substances
3. Based on paragraph 3, **flask** means:
   a. A kind of tape   c. A kind of container
   b. A kind of thermometer   d. A hot instrument
4. Based on the paragraph 3, a **condenser** is an instrument that allows:
   a. Reduce the temperature of a substance
   b. Increase the temperature of a substance
   c. To maintain the temperature of a substance
   d. To evaporate a substance
5. Based on paragraph 4, **suitable** is a synonym of:
   a. Inappropriate   c. Dangerous
   b. Appropriate   d. Expensive
6. Based on paragraph 5, you could replace the word **ensure** by:
   a. Forget   c. Make sure
   b. Produce   d. Reject
7. Based on paragraph 6, the expression goes through means that:
   a. The substance is retained by the filter
   b. The substance can pass across the filter
   c. The substance cannot pass across the filter
   d. The substance is eliminated

SELF-EVALUATION

Base your opinions on the strategy you used to read the passage (Guessing the meaning of words)

1. What did you learn about separation of mixtures? Explain
   we learn about new vocabulary, and other methods to separate mixtures

2. What did you learn about language (verbs, adjectives, tenses, etc)? Explain
   new words in english like: suitable, constituent and flask

3. How could you get the answers to part C? Explain...