



**The use of Content and Language Integrated Learning (CLIL) approach to improve
comprehension language skills and science subject matter at a public elementary school
in fourth and fifth grades in Medellín**

Action Research

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Dedication

This work is dedicated, first and foremost, to our parents and sisters, whose unconditional love, values, and perseverance have shaped the people and the professionals we are becoming. To our families and closest friends, who have walked beside us with patience, encouragement, and genuine affection throughout this academic pathway. This work is also yours.

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Abstract

This action research project explores how CLIL (Content and Language Integrated Learning) can support English learning in a Colombian public school, considering the influence of national guidelines such as the DBAs and the Estándares Básicos de Competencias. These policies have shaped the teaching of English across the country, and many schools have combined them with international approaches to strengthen communicative competence and increase students' motivation. In this study, CLIL was implemented and adapted to the contextual realities of fourth and fifth grade learners in the Alfredo Cock Arango site of the I.E. San Vicente de Paul, with the purpose of integrating meaningful content with purposeful language use.

Through a cycle of planning, action, observation, and reflection, the project examined how CLIL-based lessons influenced student engagement, participation, and communication in English. Data were gathered through class observations, reflective journals, and student work. Findings suggest that students responded positively to content-rich tasks that encouraged them to use English in authentic ways. The process also highlighted challenges related to time, materials, and the need for collaborative support. Overall, the study shows that CLIL can be a valuable approach for promoting motivation and communicative competence when adapted to local needs and supported by reflective teaching practices.

Keywords: CLIL, bilingual education, cross-curricular learning, English comprehension, natural sciences.

Resumen

Este proyecto de investigación-acción analiza cómo el enfoque AICLE (Aprendizaje Integrado de Contenidos y Lengua Extranjera) puede fortalecer el aprendizaje del inglés en una institución educativa pública de Colombia, teniendo en cuenta la influencia de lineamientos nacionales como los DBAs y los Estándares Básicos de Competencias. Estas políticas han orientado la enseñanza del inglés en el país, y muchas escuelas las han articulado con enfoques internacionales para promover la competencia comunicativa y la motivación estudiantil. En este estudio, AICLE fue implementado y adaptado a las realidades de contexto de un grupo de estudiantes de cuarto y quinto grado de la sede Alfredo Cock Arango de la I.E. San Vicente de Paul, con el fin de integrar contenidos significativos y un uso intencional de la lengua.

A través de un ciclo de planificación, acción, observación y reflexión, se examinó cómo las clases basadas en AICLE influyeron en la participación, el compromiso y el uso comunicativo del inglés. Los datos se recopilaron mediante observaciones, diarios reflexivos y producciones estudiantiles. Los resultados indican que los estudiantes respondieron de manera positiva a actividades basadas en contenido que promovieron un uso auténtico del inglés. El proceso también evidenció desafíos relacionados con el tiempo, los materiales y la necesidad de apoyo colaborativo. En conjunto, el estudio muestra que AICLE puede ser un enfoque valioso para promover la motivación y la competencia comunicativa cuando se adapta a las necesidades locales y se sustenta en la reflexión docente.

Palabras clave: CLIL, educación bilingüe, aprendizaje transversal, comprensión del inglés, ciencias naturales.

Introduction

In Colombia, there have been some new strategies to learn English that have been implemented through the years with the purpose of strengthening the communication ability using a foreign language and permeating motivation in the educational community. Governmental strategies like DBAs and the Estándares básicos de competencias were the most fundamental strategies that guided English as a foreign language in the country. Additionally, they were combined by schools in their implementation with some international approaches that have reinforced the teaching and learning through some required adaptations due to the contexts.

English language teaching continues to face challenges related to student engagement, teacher training, and the integration of meaningful methodologies. At a public institution in a neighborhood of Medellin, elementary school students have shown limited awareness of English. This situation reflects a wider national reality where English is still perceived as distant from the daily lives of students, especially in public schools.

To address this issue, our research explored the influence of the CLIL approach conducted by natural science classes on a public institution, in order to foster language comprehension skills that helped students to communicate in English as a foreign language. It also prepared students in the sense of being more competent in learning English in the field of advanced education levels.

With all the interventions supported on the mentioned approach, students acquired not just the objectives of the English subject but the natural sciences' as well. It is certainly significant since English teachers were not competent in natural science subjects, but the primary teachers were. The last issue was a strong challenge and opportunity to receive collective support and to adapt our knowledge and strategies with CLIL and community needs.

To enrich our project and to collect data some tools such as journals, students' materials, professor observation and interviews were used. Overall, the data collected throughout the different instruments revealed that students progressively enhanced their ability to understand instructions in English, participated more actively when lessons were supported with contextualized materials, and showed clearer connections between the natural science content and the language used in class. The different tools demonstrated consistent improvements in comprehension, engagement, and content learning, indicating that integrating English and natural science through CLIL offered meaningful opportunities for students to strengthen both areas simultaneously.

The implementation of the CLIL approach in this public institution showed that integrated language learning with meaningful curricular content can effectively address the challenges associated with English education in Colombia. The research not only strengthened students' comprehension and participation but also highlighted the importance of collaboration between English and other subjects teachers in bridging educational gaps. The experience confirmed that when English is taught through more engaging and relevant content, students become more motivated and confident and are able to continue developing their abilities in English.

Description of the Context

The school, San Vicente de Paul, is located at Robledo Cordoba neighborhood in Medellin. This action research project has been implemented more specifically at Alfredo Cook Arango site with some elementary school grades. It is mainly near Pablo Tobón Uribe hospital, Universidad de Antioquia and Terminal del Norte.

The groups in which the project is taking place are from 3rd to 5th grades. The 3 groups from 5th grade and 1 from 4th grade are the ones who are going to be part of the CLIL

classes implementation. Some other English traditional classes are implemented for 3rd and 4th graders. The students are around 8 and 11 years old, in these classrooms the average number of students ranges between 40 and 42. Most of the students live in surrounding areas, however there are some that come from Venezuela.

Some motivation of students to learn English is the way our CT develops her classes catching students attention with ease and how she is engaged with the lessons preparation. The CT guides her classes using a lot of materials, digital and physical, and tools and fosters students' motivation.

She was born in Bello, she was raised in a professors' family. She studied in Escuela Normal Superior in Copacabana. She got a pedagogical bachelor degree. Then, she started to do a "ciclo complementario" that is like doing 12th and 13th grades. This "ciclo" helped her to graduate as an Education Technologist. She studied her foreign languages degree at UdeA and she finished it in 2009. Then she started to work in private institutions. Later on, she presented at VIF international education and for 5 years she was an ESL teacher in a public school in Virginia. In 2014 she started to study her masters degree in foreign language teaching in a virtual way with Universidad Iberoamericana from Puerto Rico, she finished it in 2016. Then, she came back to Colombia and started working at Universidad Eafit. After 3 years, she began to work as a trainer professor at Universidad Luis Amigó. After that, she presented the national teaching contest and started to work at the current site.

Regarding the development of her classes, she always seeks to have her students ask questions, question themselves, use more positive persuasion than imposition. We saw that her classes were well appropriate to develop classes in other subjects using English and encouraging the language learning by taking advantage of different class spaces and curricula.

She is looking for making appropriate classes for her students, with all the possible resources, passion and taking into account their needs and difficulties, but also their strengths like their positive attitude, knowledge previously given by the teacher and even the affection and willingness that they have for her. In consideration of these things that we saw last semesters, we have noticed that there are big challenges in terms of material adaptation and creation; motivation to generate commitment with English in the academic community.

Statement of the problem

The decision of doing this research emerged from the desire to improve students' knowledge on sciences, encouraging different learning processes in English and seeing what else brought the approach as findings arise. Therefore, the best approach that suited the project was CLIL due to it promotes the subject matter and language contents in a cross curricular way. CLIL approach makes English learning processes easy to contextualize contents according to the realities students live. In addition, Colombian DBA policies promote the integration of subjects and the cross curricular teaching and learning procedures. This interest was selected because it would allow the research to see how the educational community could react to a new approach implementation and how it would help them to improve their foreign language learning processes by integrating language acquisition and subject matter in natural science.

As part of the issue, It was observed that students were not completely familiarized with English due to their teachers not having enough English knowledge to teach, as our main CT currently does. It was also identified that many students were not totally conscious about how to follow some instructions and it could be difficult at the teaching moment. Prior situation ideas were identified through some educators' comments that contributed from informal conversations. Moreover, most of the students' behaviors in classrooms were not the

most appropriate, which increased the lack of attention, discipline and learning that revealed an affectation in education learning processes.

The decision to have the CLIL approach as the main base of the research was also deeply influenced by the cooperating teacher's pedagogical practices and performance in the classroom. Her ability to integrate language and subject matter through meaningful and well-structured lessons demonstrated that it was possible to use alternative strategies while continuing high academic standards and active student engagement. Her innovative and contextualized methodology inspired the idea of adopting CLIL as the central procedure for this project, as the approach naturally connects content with real-life contexts, fostering both linguistic and disciplinary learning. Additionally, the teachers' school staff responded positively to the proposal, recognizing the potential of this approach to enrich students' foreign language and sciences learning. This beneficial response, combined with the observed classroom needs and the teacher's expertise, shaped the decision to explore CLIL as a way to strengthen science knowledge, improve English learning processes, and promote cross-curricular integration in alignment with Colombian educational policies such as the DBA.

Considering these factors, the implementation of CLIL represented not only a methodological choice but also a strategic response to the contextual realities faced by the institution. By integrating language learning with natural science content, the project aimed to provide students with more meaningful and engaging learning experiences that could reduce the gap between their limited exposure to English and the academic demands of the curriculum. Furthermore, CLIL offered an opportunity to reinforce classroom management and instructional clarity, as lessons became more structured, visually supported, and rooted in concrete real context content that students could relate to. The collaboration with subject teachers, combined with constant reflections and observations, allowed for a dynamic process

in which teaching practices could be continuously refined. The decision to adopt CLIL wanted to empower both teachers and students by fostering stronger disciplinary understanding, increasing motivation, and promoting a more integrated and culturally relevant approach to English education within the school community.

Research question

To what extent does the implementation of CLIL approach in groups of fourth and fifth grade students at a public school in Medellín, help them in the improvement of their comprehension language skills and their competence in science subject matter?

Objectives

General objective

To implement the Content and Language Integrated Learning-CLIL approach in order to improve comprehension language skills in fourth and fifth grade students at a public school in Medellín.

Specific objectives

1. Designing contextualized lessons based on the CLIL approach.
2. Using the CLIL approach through different learning activities to reinforce the natural sciences contents.
3. Analyzing the benefits of the implementation of contextualized CLIL approach through cross curricular content in natural sciences.

Theoretical framework

In order to illustrate our project and implement this action research (AR), guided by our problematics, we have decided to support it on concepts that will help us to reflect on the importance of using CLIL approach in a Colombian context of a public school. Improving students' learning processes would be the motivation for developing this research, taking into account the challenges that might arise throughout all the processes. In the next sections we will introduce definitions connected to CLIL approach and Colombian policies including its adaptations related to learning and learning processes in elementary education. In addition, some advantages and challenges of the implementation will be highlighted.

By grounding the study in these theoretical and contextual foundations, we aim to construct a clear framework that supports both the implementation and analysis of our action research. Understanding how CLIL aligns with national educational guidelines, such as the DBAs and the emphasis on cross-curricular learning allows us to justify its relevance within the Colombian public school system. Furthermore, examining the benefits and limitations of CLIL provides a critical vision through which we can anticipate potential challenges and design informed strategies to address them. This conceptual foundation will guide our reflections, shape our pedagogical decisions, and ensure that the development of students' learning processes remains at the center of our research.

CLIL

Content Language and Integrated Learning (CLIL) is mainly described as an educational approach where the foreign language is used as an instrument to teach the curricular contents addressed to elementary and high school students from formal education (Dalton-Puffer, 2011).

Based on Hesánová (2015) the origins of CLIL integrate modern policies of education and antique practices of multilingualism. The term was adapted in 1994 by David Marsh in Finland. This concept is inspired by the French traditions in Canada, the UK's curricular movement, and Content-Based Instruction from the U.S.A. The CLIL was rapidly diffused in Europe to encourage plurilingualism and mobility. It also became a famous umbrella term to enrich approaches with content and languages in the 1990s.

CLIL approach focuses on the students' active role in building knowledge, as Dalton-Puffer (2011) points out that students profit self-confidence when they engage in tasks using the target language due to students having minimal risk of losing their personal identity. Collaboration is an important factor as a central role, Gay et al. (2022) explain that the CLIL encourages emotional competences since the work is interactive, communicative, and cooperative by students. Following the last idea, Montañó Acosta (2023) highlights that projects and discussions in groups provide diverse cultural perspectives and negotiation, strengthening linguistic and intercultural skills.

Moreover, Montañó Acosta (2023) indicates how the real world is brought into the classroom through authentic texts and media by producing strong connections between curricula and students' daily lives. Negotiation of meaning is another meaningful characteristic where students redefine language to guarantee comprehension. Indeed, Dalton-Puffer (2011) remarks that CLIL classes development have some negotiations different from L1 classes, that conclude that there is an active use of strategies using this approach like questioning, paraphrasing, and co-construction of understanding.

4Cs in CLIL

The 4Cs framework of CLIL leads learning by integrating subject matter, language, and personal development. Content is one of the "Cs". Kim, H. & Huh, K. (2025) highlight

that “learners are involved in the learning of subject matter and the foreign language at the same time” (p. 27), making content and language mutually enhancing. Another “C” refers to Communication, which is emphasized since language is a path of communication and learning, not just an academic tool. Cognition is central, as “thinking processes need to be analyzed, understood and used explicitly” (Kim & Huh p. 28) to promote further learning. Finally, culture enhances intercultural awareness because it “offers opportunities for learners to understand themselves and others as well as to be aware of the plurality of perspectives” (Kim & Huh p. 29).

Cross-curricular teaching

Cross-curricular teaching emphasizes the focus of teachers in curriculum development, arguing that “there is no curriculum development without teacher development” (Savage, 2011, p. 8). Based on this concept, skills, understandings and knowledge must be integrated with pedagogy through curricular subjects to foster richer learning experiences. “A cross-curricular approach to teaching is characterised by sensitivity towards, and a synthesis of, knowledge, skills and understandings from various subject areas” (Savage, 2011, p. 9).

Peshkin (1988) cited by Savage in 2011 affirms that teacher’s values and professional perspectives are described as teachers’ subjectivity that perform an important role like the sun that cannot be eliminated. Consequently, the concept of cross-curricular does not just mean to blind the subjects but transforming pedagogy and bearing in mind that teachers’ role is related with the innovation of pedagogy and being an educational agent.

CLIL adaptations in Colombian contexts

This approach has evolved during the broader framework of bilingual education policies created by the Ministry of Education. Rodriguez Bonces (2011) clarifies that some

Colombian schools have taken CLIL “not only as teaching a core area in English, but as a long process” (p. 79), needing order of language learning processes and approaches, teachers learning, creation of material, and intercultural proficiency. Institutions use CLIL in different ways, “teaching at least a core area – in most cases science” (Rodríguez Bonces, 2011, p. 83) and cross-curricular scheme or instructions in another language for other areas like maths and social studies. At a further education level, Montoya and Salamanca (2017) talk about CLIL as a reply to “home internalization” students’ English proficiency reinforcement policy, is the objective of teacher training and curriculum redesign, while holding a disciplinary learning. These adaptations remark the requirement for flexibility, as rural and urban institutions diverge in resources, immersion in English, and time for instructions.

Advantages and challenges of implementing CLIL

The Colombian context presents diverse advantages and disadvantages in CLIL applications. According to Rodríguez Bonces (2011), some of the benefits are that CLIL gives possibilities for students to obtain a new language while practicing main subjects like mathematics, nature sciences or social studies, furthermore increases listening, interactions and conceptual abilities. Montoya and Salamanca (2017) state that the implementation of “interesting and motivational didactic resources” facilitated learners and instructors identify “pedagogical advantages for the learning of content and of the foreign language English” (p. 107). Nevertheless, difficulties persist, Rodríguez Bonces (2011) emphasizes the urgency for constant teacher training, the development of appropriate resources, and seeing cultural competences as elements for success with critical aspects. In addition, unequal institution situations such as limited time for English teaching in rural schools, make CLIL applications harder. Challenges highlight that CLIL has powerful potential in Colombian contexts, but at

the same time this approach needs systemic assistance and contextual adjustments to assure equity and efficacy.

Colombian English subject DBA

In Colombia, DBA (*Derechos Básicos de Aprendizaje*) point to ensure equity and coherence in English language learning. Based on the Colombian Ministry of Education (MEN) these rights are knowledges and skills that students must acquire and develop from the different Colombian education system levels. The DBA establishes a development of communicative competence, associated with the national curriculum and standards. In order that: “los estudiantes alcancen las metas planteadas en los Estándares Básicos de Competencia sobre un nivel de dominio de inglés pre intermedio (B1) al culminar grado 11” (MEN, 2016, p. 11). It is important to remark that the DBAs are not separated activities but a complement to build updated curricula proposes, attending as reference points for educational communities, families and policymakers to guarantee a constant and integral language education.

Action plan

As our purpose requires, some actions we want to follow to organize our action plan, we are going to teach 4 hours per week of CLIL lessons supported on natural sciences as subject matter. Each of us is going to have 2 groups of the ones mentioned at the beginning. One is going to teach 2 groups of 5th grade and the other one to 1 of 5th grade and 1 of 4th grade. So, it means that each group of fifth grade and one for fourth grade are going to have a natural sciences class per week supported by the CLIL approach. The topics taught in class are going to be given by the sciences CTs, who will be attending the class and supporting if it is required, helping specially with group management and observations to contribute with

some recommendations to overcome our teaching performance and to improve students' experiences. Doing it, it has an advantage of having the opportunity to compare and accept the challenges that may arise in the academic context.

The other two hours are going to be dedicated to English lessons with the main CT specially planned for doing it with co-teaching. The assisted groups with the co-teaching strategy will be specially a group of fourth grade and one of third grade. To guide these classes, it is necessary to make and adapt some lesson plans following the CT's instructions and DBAs established by the Colombian Ministry of Education. Then, we are going to support our ideas by doing daily journals and making some reflections to have the opportunity to go over and interpret the different meanings all sessions and moments could have. Also, in the near future we are going to implement a survey for the subject CTs where they are going to describe their personal experiences having English language preservice teachers in their classrooms.

As a way to support our specific objectives, we are going to collect some evidence about the students progressive knowledge in sciences and notice how they will understand instructions as well. This evidence will be supported by some worksheets and posters based on topics that are going to be taught. Furthermore, an additional satisfaction survey is going to be developed to perceive students' perspectives and how comfortable the classes will be to them. Afterwards, we will need to do more observation moments as a tool to develop the analysis and the results of our research project. Finally, we are going to use different technological and digital tools to reinforce our effectiveness in the processes of planning and teaching classes to be linked with the CLIL approach as much as possible.

This action plan is going to be a structured and collaborative pathway to implement CLIL in a productive way within the natural science and English classrooms. Based on reflections, data collection and analysis we are going to aim to create a learning environment

that not only reinforces students' knowledge, but also enhances their English language comprehension in significant ways. The use of journals, observations and surveys, in addition to contextualized materials will allow us to check progress, identify challenges and modify strategies based on the classroom contexts and needs. In general, this plan will seek to ensure that the teaching practices remain aligned with both institutional expectations and student's learning processes, contributing considerably to the development of our research and the enrichment of the academic aspects.

Development of actions

The action research procedure started with the observation stage, performed from August to November 2024 with fourth grade students at a public school in Medellín. This introductory step aimed to identify the main learning needs and understand the educational community dynamics supported with informal conversations with teachers as well. During this stage, it was possible to identify that many students faced difficulties understanding English instructions and vocabulary. Additionally, it was noted that they often resort on Spanish translations to comprehend class activities, revealing a limited exposure to English as part of their whole academic experience. These observations, supported by journal entries and discussions with the cooperating teacher, led to identify the central issue: the necessity to improve students' comprehension and engagement in English learning while reinforcing science content through cross-curricular integration.

In the first semester of 2025, the next stage involved planning the interventions. Based on the research objectives, CLIL approach was chosen as the pedagogical strategy to connect English with natural science subject learning. This decision was strongly influenced by the cooperating teacher's innovative and contextualized teaching style, which demonstrated that it is possible to integrate language and content learning without

compromising academic results. Her positive classroom performance and willingness to collaborate inspired the use of CLIL as a feasible approach to foster meaningful, contextualized, and engaging lessons in the school environment.

The action plan established that CLIL lessons would be implemented for a total of four hours per week, focusing on science topics selected by the natural science teachers. Each preservice teacher was assigned two specific groups to work with: one researcher guided two fifth grade groups, while the other worked with one fifth grade and one fourth grade group. The science cooperating teachers participated actively by suggesting the topics, supporting classroom management, and offering feedback to strengthen the lessons. This collaborative structure allowed the practitioners to compare results across different grade levels and reflect on the challenges and advantages that arose in the teaching context, all these reflected on journal entries.

In addition to the CLIL sessions, two extra hours per week were devoted to English co-teaching classes guided by the main cooperating teacher. These sessions were conducted with one fourth grade and one third grade group, following lesson plans designed in accordance with the DBAs and the instructions provided by the CT.

Throughout the implementation, a variety of data collection instruments were used to collect and reflect on the process. Teaching journals were written to document students' reactions, classroom dynamics, and the researchers' reflections on their performance. The evidence of students' progress was compiled through worksheets (appendix A), posters, and short class comprehension activities related to the science topics studied. Furthermore, satisfaction surveys (appendixes B & C) were designed to gather both teachers' and students' perceptions about the integration of English into science classes and to identify their attitudes toward this new learning experience.

The reflection stage occurred simultaneously with implementation. After each session, the preservice teachers analyzed the outcomes of their lessons using journal reflection. This reflective process provided continuous feedback and allowed for immediate pedagogical adjustments, ensuring that the action research remained dynamic and responsive.

The final stage of the project was centered on the systematic analysis of the information gathered through the different instruments. Once all journals, the observation report, students' materials, and satisfaction surveys were compiled, the researchers examined the data to categorize recurring patterns related to comprehension, engagement, and cross-curricular learning. This analytical process allowed the preservice teachers to connect the documented classroom experiences with the objectives of the study and to identify the extent to which the CLIL approach contributed to students' language comprehension and understanding of natural scientific concepts presented in class. Through triangulation of the instruments, the analysis highlighted consistent evidence of students' progress in following instructions in English, increased participation fostered by contextualized materials, and strengthened learning of science content. These results guided the interpretations presented in the findings and interpretations section and closed the action research cycle, demonstrating how the implementation, reflection, and analysis stages collectively informed a deeper understanding of the impact of CLIL in this school context.

Findings and interpretations

The analysis of the data obtained from journals, tutor class observations, and student and teacher surveys revealed a regular pattern concerning the effectiveness of integrating content and language learning in natural science classes. The findings demonstrated considerable developments in students' comprehension strategies, increased engagement through contextualized lessons, and meaningful evidence of how cross-curricular learning

augmented both science content expertise and English language learning. The results are presented through three global categories that emerged across all instruments: (1) comprehension and understanding of instructions, (2) engagement and contextualized learning processes, and (3) cross-curricular reinforcement of scientific content. Each category integrates direct evidence from the data to ground the interpretations in the lived realities of the classroom.

Development of comprehension and understanding of instructions

One of the most visible findings across all the instruments was the progressive improvement in students' comprehension of English instructions during CLIL lessons. Early journal entries emphasized the initial difficulties that students experienced when exposed to English as the language of instruction. In the first journals, several students were described as being not totally conscious about how to follow instructions, requiring frequent repetition, modeling, or translation. A journal entry reported that during a language-based task, some of the students didn't understand the instruction quickly, revealing a gap in listening comprehension and processing of English.

Evidence from the journals showed constant improvements in students' ability to follow instructions as the CLIL lessons progressed, particularly when modeling and visual support were used. Journal 1 (March 7th, 2025) described that students were able to understand what to do only after the preservice teacher demonstrated each step clearly, while Journal 4 (March 28th, 2025) registered that several learners followed the activity correctly only after the instructions were repeated and accompanied by gestures. Journal 2 (March 12th, 2025) noted that although students initially depended on Spanish to clarify tasks, they gradually began reacting to English cues with greater confidence. Likewise, Journal 5 (April 4th, 2025) highlighted that students frequently waited for the preservice teacher's example

before starting their work, reinforcing the importance of modeling in their comprehension.

The class observation report supports these patterns, noting that students showed active engagement when instructions were demonstrated through gestures and visuals, which helped bridge comprehension gaps and facilitated more independent participation over time.

Teacher surveys also reinforced this finding. One of the CTs explained that “students understand the content, as evidenced by their questions and ideas about the explanations provided by the practitioners” (teacher's observation of ¿Ha notado que sus estudiantes comprenden los contenidos de ciencias al trabajar con los practicantes? ¿De qué forma?), to understand topics through dynamic explanations and visual aids, contributing to clearer comprehension of both English and science content. Another teacher noted that preservice teachers reinforced the explanation in a simple and clear way, which reveals the importance of simplifying language without reducing the complexity of the content.

The increased understanding of instructions was also evident in how students participated in English-mediated tasks. In one observation, students were able to name some characteristics of matter and identify concepts such as “flow” and “solid or liquid,” demonstrating not only vocabulary acquisition but also the ability to connect content words to observable phenomena. This reflects a key principle of comprehension in CLIL: making meaning through contextual gestures, hands-on activities, and constant exposure.

Over time, students demonstrated a growing ability to follow directions independently. A journal entry describes that during a science experiment, the majority of students performed the actions as instructed without hesitation, showing that their listening comprehension had become functional within the academic context. The progress from confusion to autonomy indicates that the CLIL approach effectively supported the use of English as a vehicle for meaningful communication, coherent with its pedagogical intentions.

Engagement and contextualized learning processes

A second major pattern emerging from the data relates to students' engagement and motivation during the CLIL implementation. The journals consistently highlighted a noticeable contrast between the students' behavior in regular classes and their attitude during CLIL sessions. In the CTs survey, one of them noted that "Students comprehend the contents of sciences when they work with the preservice teachers because they feel motivated and most of them participate" (teacher's observation of *¿Cómo describiría la experiencia de tener practicantes enseñando ciencias naturales en inglés a sus estudiantes?*) suggesting that innovation contributed positively to engagement. Another entry emphasized that students showed excitement when materials were introduced, indicating that multimodal and contextualized resources caught their interest.

The observation report corroborated these statements, describing several moments in which students demonstrated "high levels of participation," (Class observation report, October 22nd, 2025) particularly during interactive and hands-on activities. For instance, during the activity in which students identified liquids and solids, the report notes that they were very engaged, actively sharing what they saw and knew, showing both motivation and content review. Even students who typically struggled with attention or discipline were observed to participate effectively when physical materials or visuals were involved.

The surveys provided quantitative support for this trend. Students reported high levels of satisfaction with the CLIL lessons, with items such as "Did you like the CLIL classes?" receiving powerfully positive responses. The student satisfaction percentage averaged around 94.6%, reflecting a generally favorable perception of the approach. One student wrote in *¿Qué es lo que más te gustó de las clases de ciencias en inglés?* "Aprendí cosas nuevas y me encantó mucho." illustrating that novelty and meaningful learning contributed to their engagement.

Teacher's feedback also pointed to increased student motivation. One of the CTs shared that students were motivated because the class was explained in different ways, suggesting that variation in methodology, characteristic of CLIL, stimulated students' interest. Another CT noted that students felt encouraged to participate because they felt accompanied and supported, which highlights the value of co-teaching and scaffolding.

Furthermore, the journals revealed that contextualization played a key role in maintaining student engagement. The use of visual aids, realia, and explicit modeling consistently helped students understand the natural science content and stay focused on the tasks. For example, one journal reports that learners reacted positively when the teacher used real objects to show the "characteristics of forces" allowing them to connect English vocabulary with concrete elements from the activity. Another entry explains that students were more attentive when the teacher demonstrated each step with gestures and examples before asking them to work, showing the importance of multimodal scaffolding.

Across the journals, preservice teachers described how students became more engaged when the lesson included images, objects, and movements, particularly because these elements helped reduce confusion and created clearer connections between English and science concepts. As a result, contextualized CLIL strategies promoted meaningful learning by linking classroom activities with the concrete materials and examples that students handled during the lessons.

Cross-curricular reinforcement of scientific content

The third category emerged from the data related to how CLIL facilitated the reinforcement and internalization of scientific concepts. One of the clearest findings is that students successfully learned and recalled natural science vocabulary and processes while working in English. Journals reported multiple examples of students correctly naming states

of matter, physical properties, or characteristics of solids and liquids. After several sessions, students were documented in journals saying words such as “solid,” “liquid,” “dense,” and “flow,” reflecting meaningful vocabulary acquisition linked to content knowledge.

Evidence from the classroom observation showed that the integration of English and science content allowed students to reinforce key natural science concepts while simultaneously engaging with the foreign language. Throughout the session, students demonstrated understanding of scientific ideas such as contact forces, gravity, friction, magnetic force, and deformation, which were introduced through hands-on demonstrations and real-life examples. For instance, when the teacher used plasticine to show deformation and a balloon to demonstrate friction and static electricity, students were able to connect the scientific phenomenon to English expressions like “the balloon attracts the hair,” which they produced spontaneously during the activity (Class observation report, October 22nd, 2025). Similarly, during the explanation of gravity and magnetic attraction, students paraphrased the concepts in their own words, “gravity puts things down” and “magnets attract metal”, showing that they were not merely repeating vocabulary but internalizing the scientific principles through language use (Class observation report, October 22nd, 2025). The observation further indicates that students successfully classified materials as solids, liquids, or objects affected by forces, demonstrating that the content was understood even when presented in English. The teacher’s choice to use familiar, real-life materials (balloons, plasticine, classroom objects) also strengthened this cross-curricular connection, as students could immediately relate what they observed to the English terminology introduced in the lesson (Class observation report, October 22nd, 2025). Overall, the observation provides clear evidence that the CLIL approach supported students in learning science content meaningfully while expanding their English comprehension and production.

Student surveys also suggested that CLIL helped them understand science better. Many students responded in a positive way to items indicating whether they learned new content through English-based science lessons. The report showed that a high proportion of students felt that they learned better with images and experiments, which reinforced the idea that cross-curricular activities supported their content retention.

Teachers further validated the impact on scientific understanding. One of the CTs mentioned that students recognized the topic more easily because of the visuals and experiments, and another highlighted that the activities allowed students to connect what they learned in science with the English lesson. These teacher perceptions indicated the integration of English into natural science content. English reinforced disciplinary knowledge instead of delaying it, a frequent concern in CLIL contexts.

Journals also showed significant evidence of cross-curricular learning. In several entries, the preservice teachers describe students making connections between previously learned content and new information presented in English. For example, journals recounted that students remembered the topic from last science class and applied it during the session, demonstrating transfer of learning. Another entry stated that students were able to describe the changes in matter using the words practiced in class, showing consolidation of both content and language. Overall, the data indicated that students did not merely memorize English vocabulary; rather, they internalized scientific concepts through active, contextualized, and multimodal experiences rooted in the natural sciences curriculum.

Conclusions

The analysis of the data gathered through journals, classroom observations, and student and teacher reflections demonstrates that the implementation of the CLIL approach contributed meaningfully to students' development of both language comprehension skills

and scientific understanding. Across the different moments of observation, students showed a growing capacity to interpret classroom instructions delivered in English, particularly when these were supported through modeling, repetition, and visual cues. As documented in several journals, learners who initially struggled to understand tasks began to rely less on Spanish translation and more on contextual clues provided by the preservice teachers. This progression indicates that comprehension was not the result of memorization but of sustained exposure to multimodal scaffolding, which allowed students to gradually internalize routines and instructions in the foreign language.

Similarly, the findings reveal that students' engagement increased significantly during CLIL lessons, especially when activities incorporated real-life materials, demonstrations, and structured modeling. Journals repeatedly describe instances in which students became more attentive, motivated, and active when the lessons involved movement, visual resources, or hands-on scientific tasks. This pattern was also reinforced by the class observation, where students participated enthusiastically in the identification of forces, responding to English signals with curiosity and confidence. The coherence between student surveys, teacher comments, and descriptive classroom notes further supports the conclusion that contextualized CLIL practices promoted higher levels of motivation by positioning learners as active participants within meaningful learning experiences.

The integration of English with natural science content also played a central role in strengthening students' disciplinary understanding. Evidence from the class observation report shows that students were able to explain scientific phenomena, such as gravity, magnetic attraction, friction, and deformation, using simple English expressions that reflected conceptual understanding rather than rote vocabulary repetition. Their spontaneous comments, such as "gravity puts things down" and "magnets attract metal," illustrate how the combination of real materials, guided demonstrations, and accessible language enabled them

to construct meaning effectively. Furthermore, the use of familiar objects like balloons, plasticine, and classroom materials allowed students to connect English terminology to observable scientific processes, reinforcing the cross-curricular nature of learning and consolidating content knowledge through language use.

In addition, the journals documented the consistency with which students relied on modeling to make sense of scientific tasks presented in English. Examples across multiple entries show that learners waited for the teacher's demonstration to begin an activity, followed gestured instructions with increased independence, and progressively adapted to English-mediated routines. The alignment between journal evidence and the observation report, which described strong student engagement when gestures and visuals accompanied the explanations, demonstrates that modeling was not merely supportive but essential to facilitating comprehension within the CLIL framework. This suggests that multimodal teaching strategies were necessary to bridge linguistic gaps while enabling students to access scientific content meaningfully.

Overall, the collected data confirm that CLIL created conditions where content and language learning mutually reinforced one another. Students not only strengthened their comprehension of English instructions but also increased their understanding of scientific concepts through contextualized, hands-on, and visually supported lessons. The convergence of evidence from journals, observations, and surveys strongly suggests that CLIL is a powerful pedagogical approach for public elementary school contexts in Medellín, particularly when implemented through collaborative teaching, planned scaffolding, and materials that connect disciplinary learning to students' lived experiences. By effectively combining language acquisition with science content, CLIL helped students develop communicative strategies, conceptual understanding, and increased engagement, demonstrating its potential to enhance both linguistic and academic development.

Recommendations

Based on the insights obtained from the implementation of CLIL in the present research, several recommendations can be offered to future teachers, researchers, and institutions interested in adopting this approach. First, it is recommended that any CLIL initiative begins with a diagnostic phase, in which teachers conduct structured observations, collect samples of students' work, and engage in informal conversations with learners and colleagues. This initial stage will help identify linguistic gaps, prior knowledge in the content area, and students' level of familiarity with English or any target language in which CLIL may be implemented. A needs analysis should also include an examination of curricular demands and institutional expectations to ensure that CLIL lessons align with the school's broader pedagogical goals.

A second recommendation is the development of cooperative planning between language preservice teachers and content teachers, especially in primary education due to the lack of language teachers in elementary schools. Joint planning meetings allow educators to negotiate the depth of scientific, mathematical, artistic, or social science content that can realistically be integrated into a CLIL lesson without overwhelming learners linguistically. In this sense, co-teaching or periodic exchanges between teachers can strengthen the implementation, as each teacher contributes expertise that supports the other. Establishing an ongoing reflective space is also advised, so teachers can meet regularly to evaluate student progress, adjust materials, and decide on future learning goals.

Furthermore, future implementations would benefit from expanding the repertoire of multimodal and hands-on materials, as these proved to be key facilitators of comprehension in our study. Teachers may incorporate experiments, manipulatives, realia, videos, augmented reality apps, or digital simulations depending on the content area. For example, CLIL can be used not only in natural sciences but also in mathematics: using visual models, number

manipulatives, and problem-solving tasks; social studies: maps, timelines, role-plays; physical education: movement verbs, commands, body awareness; arts and music: songs, instrument descriptions, creative projects; or even technology and coding: block-based programming vocabulary. In multilingual contexts, CLIL can be adapted to French, Portuguese, German, or even indigenous languages, encouraging students to value linguistic diversity while developing cognitive flexibility.

In addition, the role of scaffolding strategies should be strengthened. Modeling, visual instructions, gestures, sentence starters, word banks, and demonstration videos are essential tools for lowering linguistic barriers. It is recommended that teachers design scaffolds intentionally and gradually remove them as students gain more independence. Teacher preparation is another crucial aspect. Institutions should offer continuous professional development for teachers who are new to CLIL, ideally including workshops on language proficiency, material design, formative assessment, and classroom management in bilingual or multilingual settings. It is advisable to create teacher learning communities where educators share lesson plans, observe each other's classes, exchange materials, and reflect on challenges in a supportive environment.

A major recommendation concerns institutional support. Schools should ensure that teachers implementing CLIL have access to appropriate classrooms, technological resources, and sufficient instructional time. A classroom equipped with a projector, speakers, tablets or laptops, and an internet connection significantly expands the possibilities for designing rich, multimodal CLIL lessons. Similarly, scheduling stability and administrative support contribute to sustaining long-term projects, especially when the CLIL program involves co-teaching or coordination among multiple teachers.

It is also beneficial to integrate formative assessment tools that capture both language and content learning. Techniques such as exit tickets, learning journals, student portfolios,

video recordings of experiments, self-assessment checklists, and short oral tasks allow teachers to monitor student progress continuously. These tools also promote student autonomy, as learners become more aware of how they are progressing in both the subject matter and the target language.

Finally, future practitioners are encouraged to explore innovative CLIL extensions, such as project-based CLIL, STEAM-CLIL (integrating science, technology, engineering, arts, and mathematics), virtual exchange programs with classrooms from other countries, gamified CLIL units, and bilingual school events such as science fairs, debate clubs, or environmental campaigns. These initiatives offer students the opportunity to apply language and content knowledge in meaningful and authentic contexts, increasing motivation and promoting deeper learning.

In sum, implementing CLIL effectively requires thoughtful planning, institutional support, sustained reflection, and creative pedagogical design. When these conditions are met, CLIL has the potential to enrich not only English and science learning, as shown in this study, but also other areas of knowledge and additional languages. Future educators are encouraged to view CLIL as a flexible, adaptable, and innovative approach capable of transforming traditional classroom practices and contributing to more integrated and engaging educational experiences.

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Appendix A

Human organs workshop

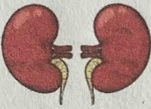
Name: _____

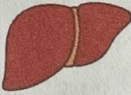
Grade: 4.3

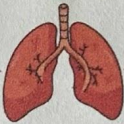
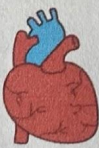
Date: Today is Friday, April 4th

1. Match the image with the correct organ name.

50 (11) Very good!






Intestines ✓

Kidneys ✓

Stomach ✓

Liver ✓

Brain ✓

Lungs ✓

Pancreas ✓

Heart ✓

Human organs workshop

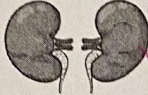
Name: _____

Grade: 5.3

Date: 7/5/25

1. Match the image with the correct organ name.

50 (11) ✓









Intestines ✓

Kidneys ✓

Stomach ✓

Liver ✓

Brain ✓

Lungs ✓

Pancreas ✓

Heart ✓

Appendix B

Teacher's satisfaction survey on Google Forms

Observaciones sobre la participación de practicantes en enseñanza de ciencias en Inglés.

Consentimiento informado

Estimada docente, reciba un cordial saludo.

Nuestros nombres son **Daniel Carmona Suaza** y **Alejandro Quintero Charlotk**, estudiantes de la **Licenciatura en Lenguas Extranjeras con énfasis en Inglés y Francés** de la **Escuela de Idiomas de la Universidad de Antioquia**. Actualmente nos encontramos acompañando los grupos de **quinto grado** y el grupo **cuarto tres** como parte de nuestro proceso de **práctica profesional**.

La participación en esta encuesta es **completamente voluntaria y anónima**. La información recolectada será tratada con estricta **confidencialidad** y solo los practicantes responsables y su asesora tendrán acceso a ella. Los datos serán utilizados únicamente con **finés académicos** y los resultados serán socializados en la etapa de presentación de resultados del curso **Práctica V**.

Al continuar con esta encuesta, usted manifiesta que ha leído esta información y acepta participar voluntariamente en el estudio.

1. ¿Cómo describiría la experiencia de tener practicantes enseñando ciencias naturales en inglés a sus estudiantes?
2. ¿Ha notado que sus estudiantes comprenden los contenidos de ciencias al trabajar con los practicantes? ¿De qué forma?
3. ¿Qué cambios ha observado en la actitud de los estudiantes frente al aprendizaje de ciencias con actividades en inglés?
4. ¿Cuáles contenidos de ciencias cree que fueron más claros o fáciles de aprender para los estudiantes durante estas clases?
5. ¿Cómo han reaccionado los estudiantes cuando deben usar palabras en inglés relacionadas con ciencias naturales?
6. ¿Qué tipo de actividades ha visto que motivan más a los estudiantes a aprender y mantener una participación activa?
7. ¿Cree que las clases contextualizadas (con imágenes, juegos, ejemplos cercanos) han ayudado al aprendizaje de sus estudiantes? ¿Por qué?
8. ¿Cómo han sido sus interacciones con los practicantes? ¿Ha sentido que se apoyan en su conocimiento de los contenidos?
9. ¿Ha notado mejoras en la participación, motivación o comportamiento de los estudiantes durante las clases de ciencias naturales?
10. En su opinión, ¿cuáles son los principales beneficios o retos de integrar el inglés en la enseñanza de las ciencias naturales?
11. Deje algún comentario adicional.

Appendix C

Student's satisfaction survey on Google Forms.

Encuesta de Satisfacción. Clases de ciencias en inglés.

Apreciado/a estudiante:

Los profes Alejo y Dani queremos saber tu opinión sobre las clases de Ciencias Naturales en inglés. Recuerda que no hay respuestas buenas o malas, ¡solo queremos conocer lo que piensas!

Marca la opción que más te parezca.

¿Cómo te sentiste durante las clases de ciencias en inglés?

- a) Muy feliz 😄
- b) Bien 😊
- c) Regular 😐
- d) Un poco aburrido 😞

¿Te gustó aprender Ciencias Naturales en inglés?

- a) Sí, mucho
- b) Un poco
- c) No mucho
- d) No me gustó

¿Las explicaciones del profesor fueron claras?

- a) Siempre
- b) Casi siempre
- c) A veces
- d) Casi nunca

¿Pudiste entender los temas de Ciencias en inglés?

- a) Si, muy bien
- b) Bien
- c) Un poco
- d) No, no entendí mucho

¿Te ayudaron las imágenes, videos o materiales visuales para comprender mejor los temas?

- a) Mucho
- b) Un poco
- c) No tanto
- d) Nada

¿Te sentiste cómodo/a usando el inglés durante las actividades?

- a) Sí, muy cómodo/a
- b) Más o menos
- c) Un poco difícil
- d) Muy difícil

¿Qué actividad te gustó más en las clases de ciencias en inglés?

- a) Dibujar o pintar
- b) Juegos o experimentos
- c) Ver imágenes o videos
- d) Escribir o leer textos

¿Crees que aprendiste más sobre Ciencias gracias a las clases en inglés de los profesores?

- a) Sí, aprendí mucho
- b) Aprendí algo
- c) No estoy seguro/a
- d) No aprendí mucho

¿Cómo fue trabajar con tus compañeros durante las actividades y clases?

- a) Muy bien, aprendimos juntos
- b) Bien, aunque a veces fue difícil
- c) No trabajé mucho con ellos
- d) No me gustó trabajar en grupo

Preguntas abiertas:

1. ¿Qué es lo que más te gustó de las clases de ciencias en inglés?
2. ¿Qué es lo que te gustaría cambiar de las clases de ciencias en inglés?