



**Facultad de
Ciencias Sociales y Humanísticas**

PROYECTO DE TITULACIÓN

**“EFFECTS OF TEACHING STREAM (SCIENCE, TECHNOLOGY, READING,
ENGINEERING, ARTS, AND MATHEMATICS) ON ENGLISH LANGUAGE
CLASSES TO FIFTH GRADE STUDENTS OF AN ELEMENTARY SCHOOL IN
SAMBORONDÓN”**

Previa la obtención del Título de:

MAGISTER EN ENSEÑANZA DE INGLÉS

COMO LENGUA EXTRANJERA

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ABSTRACT

Implementing new educational techniques and textbooks that integrate the principles of STREAM (Science, Technology, Reading, Engineering, Arts, and Mathematics) paves the way for a new trend in language learning because the integration of a variety of subjects leads to the acquisition of valuable knowledge (Stohlmann et al., 2012). The study aims at identifying the effects of teaching STREAM on a group of Fifth Grade students from a school in Samborondón, Guayas. The first chapter shows the general and specific objectives of this study and justifies the importance of exploring how the English language teaching process has evolved with the STREAM approach. The second chapter introduces the origins and evolution of the approach, laying the theoretical foundations for the following research. Chapter 3 establishes the research methodology, describing the characteristics of the participants and the methods to collect data. The fourth chapter present and analyze the results of this study, based on the following aspects: students' perceptions and motivations to learn with STREAM, students' recommendations to enhance the STREAM approach, teachers' perceptions about STREAM, and strategies and expectations with STREAM, along with some conclusions for the present study.

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ABBREVIATIONS AND ACRONYMS

BERA	British Education Research Association
BSCS	Biological Sciences Curriculum Study
CLIL	Content and Language Integrated Learning
EDP	Engineering Design Process
EFL	English as Foreign Language
EHoM	Engineering Habits of Mind
EPICS	Engineering Projects in Community Service
I-STEM	Integrated Science, Technology, Engineering, and Mathematics
MDL	Model of Domain Learning
NSF	National Science Foundation
PLTW	Project Lead the Way
R-SLAMETS	Religion, Science, Literacy, Arts, Mathematics, Engineering, and Social Studies
SLAMETS	Science, Literacy, Arts, Mathematics, Engineering, and Social Studies
SMET	Science, Mathematics, Engineering, and Technology
STEAM	Science, Technology, Engineering, Arts, and Mathematics
STEM	Science, Technology, Engineering, and Mathematics
STREAM	Science, Technology, Reading, Engineering, Arts, and Mathematics

CHAPTER 1

1.1 Background of the Study

Learning a new language has become an essential activity in the world of today. Speaking one's mother tongue now seems not enough for a person's professional development and growth. But learning a new language comes with a variety of challenges. For instance, there is a sense of fear of what is considered difficult: people tend to stay away from the things they do not understand. There is also a problem of cooperation -many learners prefer to do their tasks their way. Although this cannot be applied to all cases, teachers can measure and observe it in many classrooms these days.

The implementation of new educational techniques and textbooks that integrate the principles of STREAM (Science, Technology, Reading, Engineering, Arts, and Mathematics), paves the way for a new trend in language learning, because the integration of a variety of subjects leads to the acquisition of valuable knowledge (Stohlmann et al., 2012).

A foreign language teacher always needs to find ways to engage students to see the importance of learning. Authors have found that applying the STEAM approach gives learners new ways to understand concepts that are seen as complex by designing projects across different disciplines (Gross & Gross, 2016). Thus, the role of teachers makes a significant impact on how students perceive changes in language learning if they are aligned with the goals of the lesson or topic.

However, the idea of enhancing the teaching of English through subjects that apply the use of the target language through real-life situations has faced problems that have to do with a lack of vocabulary to follow teachers' guidelines and planning. Curricula designed to engage learners to this approach look for different strategies that encourage them to be both innovative and creative while teachers must find meaningful opportunities

to learn and apply new content (Kennedy & Ordell, 2014), which seems needed now more than ever in a virtual environment.

1.2 Statement of the problem

The purpose of this study is to identify the effects of teaching and learning of STREAM on a group of fifth grade students aged 8-9 in an elementary school in the canton of Samborondón. The aim is to understand better how teachers and students feel about this learning approach, how much students are learning, and based on the results, suggest different ways that allow a better implementation of the approach which will benefit all the parties involved in the teaching and learning processes.

The research question that determines the object of this study is as follows: How has the teaching of STREAM influenced English language learning on Fifth Grade students enrolled in an elementary school in Samborondón? Three sub-research questions that support the main one:

1. How do students feel about learning with the STREAM approach?
2. What do teachers do to enhance the teaching of STREAM?
3. How can this approach be improved to benefit both teachers and students?

1.3 Objectives

1.3.1 General objective

The general objective of this study is to explore how the process of English language teaching has evolved with the introduction of the STREAM approach.

1.3.2 Specific objectives

The specific objectives are as follows:

1. To identify insights from teachers and students about the inclusion of STREAM in the EFL (English as a Foreign Language) curriculum.
2. To analyze the way STREAM is addressed in the classroom.
3. To determine changes that can be made to enhance the knowledge of a foreign language through social sciences.

1.4 Justification

This study is to identify the effects of teaching and learning of STREAM on a group of Fifth Grade students from a school in Samborondón, Guayas based on their feelings and attitudes towards this approach, and to use this information to enrich and better implement the program. A study conducted by Rajbanshi et al. (2020) discovered that teachers were not familiar with the integrated approach, lacked STEM expertise, and preferred highlighting content and examination over quality, which led to teachers allocating more time in completing the curriculum. Identifying the gap between the STREAM approach and its implementation will help improve the program and provide teachers with the elements needed to improve language acquisition.

The combination of Science, Technology, Engineering, and Math brought STEM education to the classroom to enhance the learning process, and in the case of the school that forms part of this study, to improve the learning of a second language. Reading and Art turned STEM into STEAM and then STREAM, which is now taught as a subject for students at the elementary level of this educational institution.

A report supported by the British Education Research Association (BERA) was conducted between 2015 and 2016 to set out the foundations of STEAM education, which is described as “a hybrid concept arising at the intersection between conceptions of science

and arts” (Colucci-Gray et al., 2017, p. 7). Although the authors conclude that the term STEM is recognized both educationally and economically, there is a lack of clarity in conceptualizing STEAM, especially identifying arts as a general field or specific art practices (Colucci-Gray et al., 2017, p. 8).

Mitts (2016) states that “only Science, Technology, Engineering, and Math contain the four components of a whole-problem solution: theory, process, design, and concept” (p. 34). Hence, three questions arise from this methodology: why, how, and what. It is essential to acknowledge the relevance of these questions by applying them when working on a lesson or topic: why something happens, how this affects something, and what to do about it.

Initiatives such as *Coalición STEM* have been promoted by Ecuador’s Secretary of Higher Education, Science, Technology, and Innovation (*Senescyt*), Pichincha Chamber of Small and Medium Industry, National Education University (UNAE), and the Ecuadorian Ministry of Education in 2018. The objective is to implement high-quality education and help children acquire the skills needed to solve problems by themselves, increasing knowledge in the process (Senescyt, 2018). However, improvements have not been reported in this matter.

Technology is an important part of everyday life today, and the way it is now used in education was unimaginable a few decades ago. The challenge teachers face today is to keep up with the technological improvements and make teaching better with the resources that are now available, even though schools have not been designed to keep up in the same way.

According to one report in an Ecuadorian newspaper (El Universo, 2021) 94% of business leaders expect their employees to acquire new skills by 2025. For this reason and considering that education is not the same as it was fifty years ago, the addition of technology on this approach seems valuable and needs to be encouraged. Living in a time when people need more resources for their desired standard way of living interferes with the goals and ambitions of many students who need to take part-time jobs and take longer than expected to graduate (if they can). It is important to motivate and support this type of learners who seek to remain competitive despite the advantages younger generations have, especially due to the growing trend of social media immersion and its implications for learning.

1.5 Scope of the study

The goal of this work was to conduct a qualitative research that provides insights on how teachers and students feel about this learning approach, how much and in what ways students are learning. It is hoped that the results can be used to identify design and implement improvements to the approach for this school, and thus benefit all the parties involved in the teaching and learning processes. To this end, interviews, observations, and analysis of students' perceptions via surveys were conducted to identify the effects of the STREAM approach in English language acquisition.

The study was limited to six Fifth Grade courses, with approximately 100 students in total. Three teachers and the English area coordinator were also part of the study. Identities were kept anonymous as a sign of respect for the participants, but where it was necessary to use respondents' names, they were changed. The scope of this study was limited to Arts and Science-related subjects, although there are other English subjects, such

as Language Arts (a study of English Grammar) and Speaking and Writing (in which students are encouraged to develop their oral and reading skills).

CHAPTER 2

2.1 What is STREAM?

STREAM is a term that brings together knowledge from six different fields: Science, Technology, Reading, Engineering, Arts, and Mathematics. Authors define the R from STREAM in other ways, such as Robotics (Badmus & Omosewo, 2020) or Religion (Mubarok et al., 2020), but in the institution where this study was conducted, it refers to reading. It is a fact that education is shaped according to the environment in which it takes place.

Nuangchalerm et al. (2020) suggest “art and other related disciplines can be embedded to integrated approaches to different classroom contexts” (p. 987). The term STREAM could indicate there is an appropriate integration of the fields that are part of the approach, but different studies reflect the need for a better integration in the related areas (Dare et al., 2018; Gardner & Tillotson, 2019; Kang, 2019; Stohlmann et al., 2012). McComas and Burgin (2020), for example, suggest that when at least one of the elements is taught, it should be called STEM (STEAM or STREAM) and when two or more subjects are taught at the same time, they introduce the term I-STEM to indicate there is an integration. Gardner and Tillotson acknowledge that this integration values the different realities students face every day but finds it hard to explain how its implementation works.

STREAM has also evolved from STEM and STEAM and has become an important component in supporting education in the 21st century and the growth of several industries that want to take advantage of the skills their workers have developed in automation and their understanding of today’s world (Gumenykova et al., 2019).

2.1.1 STEM

The learning of science-related subjects has evolved from distinct processes to an integrated approach. This change in educational focus shows a change in the conception of human development and our abilities to solve problems. Sanders (2009) explains that as an initiative of the National Science Foundation (NSF) from the United States of America, SMET, a combination of science, mathematics, engineering, and technology was used in the early 1990s. This initial fusion arose so that scientists, technologists, engineers, and mathematicians have a stronger political voice (STEM Task Force, 2014). As time passed, the acronym became STEM, which also evolved over the last thirty years as the interest and knowledge about this integration has grown.

Several public reports from the United States of America have argued for the need to develop STEM skills and have linked prosperity with funding and training on these skills as well as having enough STEM teachers to teach future generations (Colucci-Gray et al., 2017). The emergence of STEM education has allowed the training of learners with updated knowledge in these areas to meet society's demands of an improved standard of living and problem-solving skills (Badmus & Omosewo, 2020). Bybee (2013) seems to agree when he states that "the educational approach emphasizes competency in addressing situations, problems, or issues, and not exclusively knowledge of concepts and processes within the respective STEM disciplines" (p. 3).

Education becomes more relevant when students see that learning does not only matter in the classroom, and the STEM approach tries to take advantage of it by being presented as a way to promote solutions to the problems in the real world. Science learning in primary schools is being recognized as a key point in 21st century education due to its use to solve daily problems (Azizah et al., 2020). Further study suggests the effects are

positive on problem-solving abilities although STEM requires time to be applied to get the expected results (Alatas & Yakin, 2021).

The importance of problem-solving skills and the connection between STEM and the Seven-Step Problem-Solving process is emphasized by Mitts (2016). Based on this assumption, he describes that the letters that form STEM imply the components of a problem-solution situation. Science explains why something happens and how this theory fits with reality. Technology describes how something can be done, transformed, or rebuilt. Engineering, on the other hand, puts things and resources into action once everything has been understood and designed. Finally, math is always required to provide quantities, formulas, prices, and other information related to numbers that allow the goal to be accomplished (Mitts, 2016, p. 31). The Seven-Step Problem-Solving process, as seen in Figure 1, correlates its elements with the components of STEM. Mitts also claims that the strong relationship between STEM and the Seven-Step Problem-Solving process indicates they should be taught at the same time because “problem-solving ability is the number one skill employers are seeking when they hire” (p. 32).

Figure 1. The Seven-Step Problem-Solving Process and its connection with STEM

Identify	Determine the problem to be solved.	Theory	Concept
Define	Understand the problem and its impact.		
Document	Report what has been found about it.		
Understand	Analyze scenarios and action plans.	Design	
Create	Develop the selected action plan.		
Implement	Test and find evidence that supports or rejects the chosen path.	Process	
Communicate	Report findings.		

Source: Author

The integration of science, technology, engineering, and mathematics enriches the learning process and gives learners the opportunity to make sense of the world around them, and more importantly, get involved in what is happening rather than being just an observer (Badmus & Omosewo, 2020). Although engineering seems a difficult field to implement in the classroom, it is all about formulating a problem that can be solved through building something that can be tested, bringing education and action together (Kennedy & Ordell, 2014). Research suggests that STEM integration can be considered a way to reshape teaching math and sciences in primary school settings despite the workload that is needed to design this approach (Bărnăuțiu-Sârca, 2021).

An important point to consider is public perception towards STEM. Although the approach is recognized and encouraged in educational contexts, one survey reports that “86% did not understand the term or confused it with stem cell research” (Colucci-Gray et al., 2017, p. 26), despite the economic relevance and impact STEM has on nations. This emphasizes the need to promote a better development of STEM pedagogies and techniques to demonstrate that what happens in the classroom is also seen outside.

Workload and the struggle to find the balance between the disciplines might be the greatest challenges that educators face today (Dare et al., 2018). These authors also point out that there are different levels of integration in the STREAM areas that are based on how teachers make connections that are meaningful for the learning process (Dare et al., 2018). Significant inclusion of technology and engineering is considered another challenge in STEM applicability, considering school policies and how their programs are designed (Bybee, 2013). Therefore, this author stresses the importance of converting STEM from a simple slogan into a real educational definition (Bybee, 2013).

2.1.2 STEAM

Because learning is pivotal when developing human resources (Susilo & Sudrajat, 2020), STEM education needed to evolve, too. Badmus and Omosewo (2020) note that art is a field of study which encompasses different representations of reality, based on the ideas, perceptions, and points of view, stimulating at the same time emotional awareness of the world around the learner. Their research indicates that the United States, Korea, and China began working on the addition of Arts since the beginning of the 21st century so that STEM becomes STEAM. However, that description is disputed by Dorofeeva et al. (2020) who claim interest in creativity arose after 2018 and, until then, there were two different viewpoints: Russian, American, and Asian work focused on technical issues while European work focused on natural sciences issues. Bucher and Pindra (2020) highlight the positive effect on early childhood development and the benefits of developing learning skills such as exploration, observation, and analysis based on evidence that can be demonstrated even by representing their ideas through art.

Arts have had a long relationship with education for more than two centuries, but it was in the 20th century in which it evolved to the point that the National Standards for Arts Education were released in 1994 in the United States (Zhbanova, 2017). This author's research suggests there is an increase in critical thinking and problem-solving abilities when integrating the standards and STEM disciplines., providing learners with skills to apply what they know in real-life situations (Zhbanova, 2017). The current version of these standards includes categories such as Dance, Music, Media, Theater, and Visual Arts and are classified in four artistic processes: Creating, Performing, Responding, and Connecting. They work under a variety of anchor standards, which define what students are expected to show throughout their arts education in the different categories (National Core Arts

Standards, 2021). and are explained in Figure 2. Improving the level of arts education in the classroom means that teachers should include assessments that address the eleven standards to link arts education with students, families, and the entire educational community (Myers, 2021).

Figure 2. National Core Arts Standards

	Creating	Performing Presenting Producing	Responding	Connecting
Artistic Processes	Definition: Conceiving and developing new artistic ideas and work.	Definitions: Performing: Realizing artistic ideas and work through interpretation and presentation. Presenting: Interpreting and sharing artistic work. Producing: Realizing and presenting artistic ideas and work.	Definition: Understanding and evaluating how the arts convey meaning.	Definition: Realizing artistic ideas and work with personal meaning and external context.
Anchor Standards	Students will: 1. Generate and conceptualize artistic ideas and work. 2. Organize and develop artistic ideas and work. 3. Refine and complete artistic work.	Students will: 4. Select, and analyze, and interpret artistic work for presentations. 5. Develop and refine artistic techniques and work for presentations. 6. Convey meaning through the presentation of artistic work.	Students will: 7. Perceive and analyze artistic work. 8. Interpret interest and meaning in artistic work. 9. Apply criteria in evaluate artistic work.	Students will: 10. Synthesize and relate knowledge and personal experiences to make art. 11. Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

Source: National Core Arts Standards (2021)

The STEAM approach, although assumed to improve science lessons, also aims to tap into creativity to stimulate learners' interest. Conradt & Bogner (2020) suggest that "STEAM may educate successful scientists, as they need to develop creative thinking skills" (p. 9). Research indicates that STEAM education improved students' scores in terms of verbal and figural creativity, making Art one of the main components of this success (Ozkan & Umdu Topsakal, 2021).

It is evident that the support of students who can work on their creative strengths towards innovation can fully diversify knowledge on STEM subjects and transform the classroom in a place that not only encourages learners to understand but to plan, design, and create. The inclusion of the field of arts to STEM does not only support creativity but enhances the connection between the other components (Mubarok et al., 2020). Mubarok et al. (2020) suggest that, in this way, Science and Technology can easily be represented through Art and Engineering, working with Mathematics along the process to increase students' skills.

Daugherty (2013) opines that the view that arts and sciences should be taught separately and to different learners has been disproved by the application of STEAM education, and that "STEM education curricula focus on clear solutions to the problems of society, while art education curricula typically express uncertainty" (p. 14) which makes it a core foundation on creativity development. Land (2013) agrees that the combination of technology and creativity is an important reason why STEAM education will lead the way to progress. Along with students' support, the role of teachers is key to enabling a STEAM approach to achieve effective learning outcomes. While there are theories that support the implementation of STEAM curricula in the classroom, "it is the educators' job to develop and/or implement the curriculum" (Land, 2013, p. 550). Boice et al. (2021) studied the

implementation of integrated STEAM lessons and claimed that “professional development and classroom practices may lead to changes in student outcomes that impact how teachers view their teaching effectiveness” (p. 122). In this case, proper teacher training in the field should be made to enhance the efforts STEAM teachers are already doing in the areas where this approach is applied.

Quigley and Herro (2016) reflect on the effects of adding Arts in STEM activities, mentioning that this merge gives transdisciplinary inquiry a more appropriate platform. Their research found there is an increase in students’ achievement in both science and mathematics while their study noted a lack of integration, indicating that “teachers need opportunities for building connections between their content area and the expressive arts” (Quigley and Herro, 2016, p. 424) as well as the importance of teachers to design STEAM programs to encourage student involvement, critical to enact integration and the authenticity of tasks (Quigley et al., 2020). Henriksen (2017) suggests a more inclusive view of STEAM which could offer real arts integration, interdisciplinarity, creativity, authentic learning, and project-based thinking, pondering the essential need to support teachers along the way.

Even though art can be viewed as something visual (drawing, photography, and painting among others) other forms of art can be incorporated into the classroom (Pollard & Olizko, 2019). These authors classify art in three forms: visual, as it was previously stated; applied, as in crafts and design; and performing, as in music or shows involving role-plays (Pollard & Olizko, 2019, p. 68). Working on classroom projects that encourage all forms of art can strengthen learners’ knowledge, social connections, and talents that in traditional education could have not been found. Colucci-Gray et al. (2017) agree that

“arts-based pedagogies facilitate the exchange of knowledge from different perspectives”
(p. 46).

2.1.3 STREAM

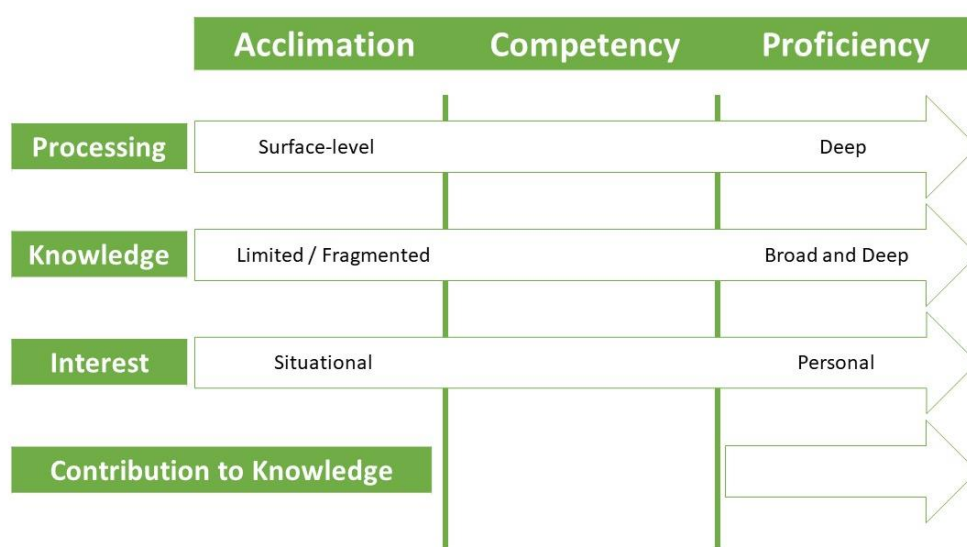
The global demand for a workforce that is specialized in science-related fields cannot rule out the importance of literacy skills. A better quality of STEM/STEAM education needs to provide learners those skills to get important career opportunities and it can be achieved with a curriculum that successfully integrates a problem-solving approach with literacy components (Lefever-Davis & Pearman, 2015). This idea might have made it possible to include Reading with STEAM to become STREAM.

Reading is one of the basic skills when learning a language because it encourages learners to use their imagination while giving them the chance to enhance their understanding skills. These aspects can be affected by the unwillingness to read and understand a text, especially if scientific content, for example, is not suitable for the level of students (Nuangchalerm et al., 2020). For this reason, working in reading comprehension at different stages or levels could lead to better performances, not only in reading per se, but also in other fields of knowledge. Practice is the key for improving reading comprehension, but motivation remains crucial because it is more intrinsic, but it can be aided from the outside with proper stimulation and inclusion of texts and tasks that rely on learners' interests. According to Hubbard (2021), an “identity as a reader therefore shapes both the text I choose to read and the approach to read them” (p. 45).

One of the aspects to consider in reading is that it is a process that never ends. The Alexander's Model of Domain Learning (MDL) summarizes this assumption (Hubbard, 2021). The MDL divides the reading process in three phases that are sequential, as explained in Figure 3: acclimation, competency, and proficiency. The acclimation phase

refers to readers who must deal with unfamiliar texts, meaning that their knowledge will be limited, their interest will be purely situational, and their processing will be superficial. The reader is in the competency phase when texts feel more related to their knowledge and level of interest with deeper processing skills. The last phase, proficiency, involves more personal interest as well as deep knowledge and processing skills. Proficient readers can even contribute with new knowledge. Hubbard also claims that literacy development is key if students want to be academically successful, but states that “being open and transparent about the challenges of learning to read in an academic context is critical” if we want to support learners in successful literacy development (Hubbard, 2021, p. 60).

Figure 3. Alexander’s Model of Domain Learning



Source: Hubbard (2021)

Problem-solving scenarios could be more emphasized in math rather than other STEAM-based practices, but it is reading comprehension that makes these more relevant. Learners need certain knowledge in recognition of words and interpretation to achieve the goals needed in mathematical curricula. It is important to note the impact reading comprehension has on something as challenging as mathematics, but it is up to teachers to design and apply materials and resources that seem relevant for their level. As research

conducted by Quigley and Herro (2016) suggests, there is evidence that math reasoning increases when that is aligned with the ability to use critical thinking and apply that in real-life situations.

Integrating reading with STEAM makes writing another important component of literacy competence. The power of writing makes it one way to demonstrate language competence, express ideas, and opinions, and enhance knowledge. In practice, effective writing is often left behind in favor of a more simplified approach. Teachers should give the importance writing deserves and dedicate time to make writing tasks a more personal activity rather than a general one.

Lefever-Davis and Pearman (2015) claim that being literate is to have the ability to analyze a variety of texts and to be creative while demonstrating competence. Among the literacy strategies to promote learners' skills effectively, graphic organizers (such as Venn diagrams and flowcharts) offer them an easy way to order their understanding and see how information is connected. Graphic organizers simplify content but also engage students in creative presentations that make knowledge more meaningful.

2.1.4 Alternative conceptions of STEM/STEAM/STREAM

Hapidin et al. (2020) consider that it is ideal for teachers that, to make learning meaningful and easy to organize, add literacy elements to STEAM content and even proposed their own term to encompass other learning fields such as Literacy and Social Studies, which was called SLAMETS (Science, Literacy, Arts, Mathematics, Engineering, and Social Studies). This proposal highlights the importance of a more integrational approach for these areas. Other authors have given the R in STREAM a new meaning, based on their reality and field of work. Badmus and Omosewo (2020) claim that, by

designing automated robots, learners can understand the use of these technologies and apply skills that might be needed in their future careers: they call it Robotics.

Other authors use the R in STREAM and call it Religion, like Azizah et al. (2020), whose study indicates that activities related to religion have the same creative effect as arts and estate in their research that “the most prominent improvement of students’ creative products assessment was the assessment of religion and art aspects” (Azizah et al., 2020, p. 245), also mentioning the positive effects of active discussion in building communication and other social-related aspects. Other supporters of Religion as part of the STREAM approach include Mubarak et al. (2020), suggesting that the importance of religion for the Indonesian culture draw the need to study it along with science; and the proponents of SLAMETS (Hapidin et al., 2020) which complete the idea of Mubarak et al. (2020) about the moral support religious-based activities give to early children education in Indonesia, calling it now R-SLAMETS, providing evidence of children being more active and innovative.

Clements and Sarama (2021) argue for the coherence of STEM without the need to add arts or literacy skills by stating that “adding the arts, reading, or other domains weakens the subject matter content” (p. 263). They explain that science already provides concepts that shape engineering and technological advances, and it is the application of engineering and technology that puts science to work to benefit the world. Even though they acknowledge the connection STEM has with other subjects, the coherence theory is an important aspect to consider when applying STREAM.

The evolution of the STREAM approach can give insights of how appropriate it has proven to be in terms of language acquisition, creativity, and understanding of content-

based activities. Its application and impact in educational contexts are main aspects to analyze in depth, making it important to study.

2.2 The STREAM approach in an educational context

The application of the STREAM approach has emerged as an important aspect in education in terms of preparing citizens who can use sciences in their professional future (Zsoldos-Marchis & Ciascai, 2019) and an effective promotion of skills such as collaboration, communication, creativity, and critical thinking (Diana, 2021). Ozkan and Umdü Topsakal (2021) even claim that the origin of these kind of approaches have originated because “new technological developments have often been associated with the potential of having a major impact on education”, making it also a political issue due to the impact of STEM careers in the development of a nation (Colucci-Gray et al., 2017).

To understand the implications of the STREAM approach in the educational context, it is important to analyze different aspects related to it. In section 2.2.1, the relevance of integrating different elements and the perceptions of teachers and students are examined. In section 2.2.2, there is a review of different theories and findings about the need to develop creativity and the role of STREAM in doing so. Further sections review the connections between STREAM and engineering skills, and the impact of the STREAM approach on learning when it has been applied in the classroom.

2.2.1 Integration and perceptions

STEM had its origins in the idea that learners do not only have to know something but also have to be ready for the challenges in their chosen field of work (Widya et al., 2019). Iyer (2017) agrees by stating that “the progress and growth of a nation depend on the emphasis placed on science and technology” (p. 16). The author’s focus was on gender differences based on motivation to learn science in India and found out there is a

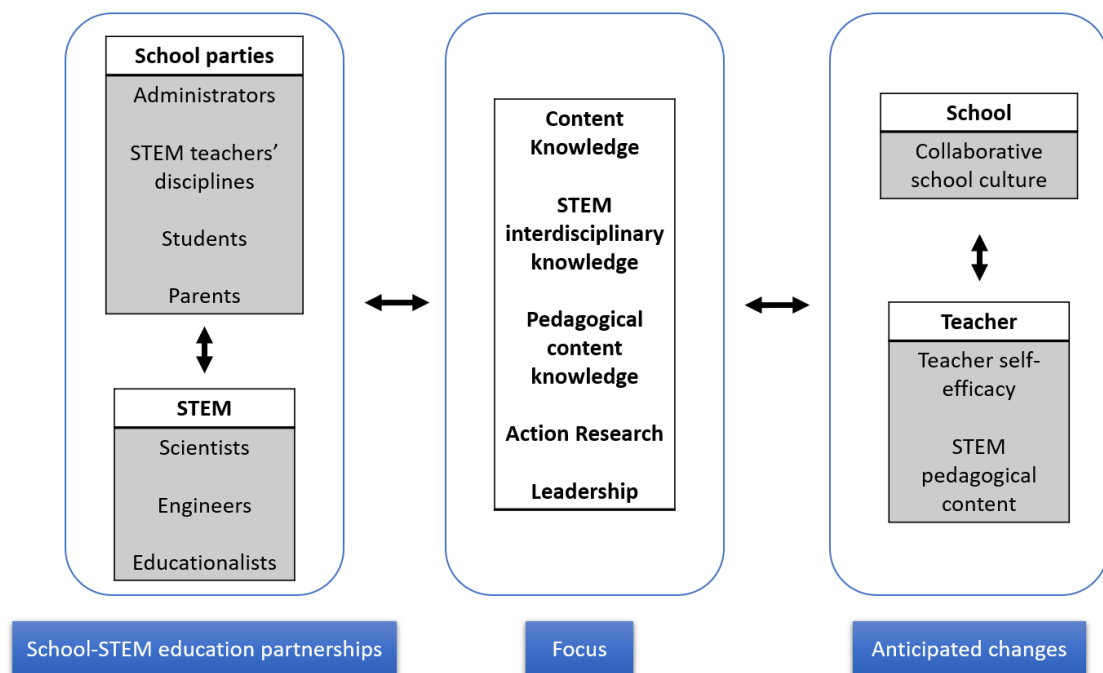
significant difference between female and male learners, suggesting female ones are more intrinsically motivated, drawing great conclusions for companies' eager to hire the workforce of the future as well as gathering efforts to improve intrinsic motivation. Although the study was conducted in Mumbai, the findings give an idea of different implications that learning science has for groups of learners.

Although gender differences can be challenging in Saudi Arabia, science is one compulsory subject taught from primary to middle school (El-Deghaidy & Mansour, 2015). Despite the compulsory status, the authors discovered that teaching is mostly done individually, and teachers from different subjects do not often identify paths they can follow to implement an integrated version of the approach. Results showed there were concerns over the lack of preparation to deliver this implementation and that science teachers must understand how science and technology can work together to enhance classroom teaching. Almalki and Faqihi (2021) studied the applicability of STEAM in pre-university education and found that providing students with activities and subjects that are non-traditional “contribute to enriching students’ information and deepening various educational experiences based on the integrative approach” (p. 369). The relevance of preparation programs and materials strengthen this contribution.

One important finding of the study conducted by El-Deghaidy and Mansour (2015) includes the need to create a school culture that facilitates the adequate integration of the approach. According to the authors, this school culture requires “collaboration among stakeholders and building a collaborative and supportive STEM community in the school” (p. 53). These science teacher perceptions towards STEM pave the way for the development of ideas that enact STEM education and show what is needed towards that goal. The STEM based Professional Development Program, as shown in Figure 4, is the

result of these findings, showing the importance of letting teachers take part of the important decisions that go around education and the application of a better integrated approach. Another look at integration is offered by Dare et al. (2018) by claiming there are different levels of integration, but they depend on “teachers’ awareness of how to make explicit and meaningful connections between the disciplines” (p. 18). Teachers should not only know everything about their subject but need to organize their classes to find such integration valuable, making a space to work with their students towards those connections. The struggle is that they need constant support, especially those who are not familiar with the approach in question.

Figure 4. STEM based Professional Development Program

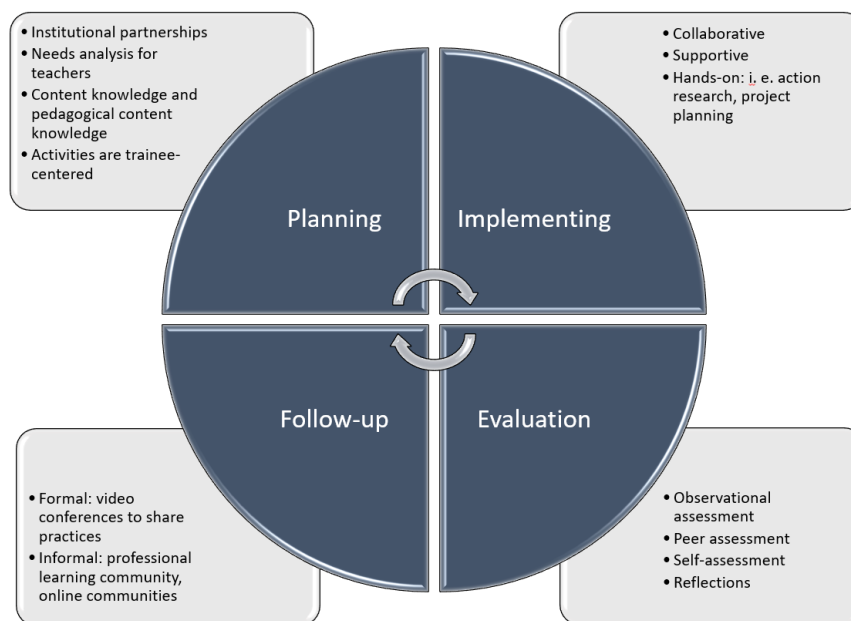


Source: El-Deghaidy and Mansour (2015)

Working with development programs is also suggested by El-Deghaidy et al. (2013), based on the assumption that educational reform is an issue of importance worldwide. The call for professional development programs for teachers is linked to the nature of the STREAM curricula because it is not only about teaching knowledge but

relating different subjects at the same time. Their research proposes a model for professional development that relies on four aspects. The planning phase, supported by state agencies promoting STEM, aims at accommodating what is known through needs analysis. In the implementation, trainees put knowledge into action with workshops and hands-on experience while the idea of a professional learning community starts to grow to be used in the coming phases. The evaluation phase will be based on a variety of assessments (self, peer, and observational) conducted by qualified staff. The final phase, the follow-up, works with the constant support of state agencies aimed at promoting STEM education in the country, with two types of follow-ups: formal and informal. Although this is based on the Egyptian STEM education system, this proposed model could be adapted to fit in any other system around the world. Figure 5 shows how this model looks, with the authors stating that a professional development program in STEM “aims at teachers’ beliefs, common understandings about STEM education and classroom practices to value interdisciplinary learning” (El-Deghaidy et al., 2013, 622).

Figure 5. Transformative Model for STEM Teachers Professional Development



Source: El-Deghaidy et al. (2013)

Implementing the approach in South Korea has constantly been supported by the government (Kang, 2019). Different teaching development programs have been provided by the initiative called Korea Foundation for the Advancement and Creativity since 2011. Courses offer an overview of STEAM as well as its agenda, objectives, and integration. Five years after this initiative began, a nationwide survey was conducted, which found that 67% of schools across South Korea offered STEAM lessons through regular classes (Kang, 2019). The results of this survey had shown that this initiative had been a success, but the author also points out the fact that teachers would implement the approach in a unique way, so its application would differ from teacher to teacher (Kang, 2019). When there is a whole system around the teacher that is monitoring, educating, and supporting them at every step, teachers' attitudes and beliefs can change, making them more effective and more committed teachers.

Bărnăuțiu-Sârca (2021), when studying teachers' views on this approach, states that the "promotion of STEM/STEAM integrated approaches is based on the premise that the world cannot be discovered and understood by students only in the light of a single discipline" (p. 100). By valuing the connection science and mathematics have with technology, engineering, and arts, the approach would become a key point in transforming teaching in primary school settings. This study shows that a better integration is possible, but with lack of support the approach is unlikely to reshape education in those settings. Considering the importance of STEM careers for the future workforce, working towards the goal of integration could boost students' interests for these disciplines. Nuangchalem et al. (2020) found out STREAM can be accepted in the classroom, but it was difficult to mix disciplines. It is recommended to analyze patterns of learning behavior in students, curricula, and assessment to shape a more reliable integration in the classroom.

Regarding students, their views of the approach have also been studied. The development of STEM has been decisive in the building of the model world (Popa & Ciascai, 2017) and this claim exemplifies how STEM has evolved to STEAM and then STREAM as well as gives a significant role to the student when becoming the society of the future in terms of production of goods and services and the protection of the environment. Popa and Ciascai (2017) studied how STEM has influenced university education decisions and how its implementation in early educational stages helped them to study a STEM field. According to their findings, 96% of the participants had graduated from high schools where the learning of sciences was intensive, while there was a positive attitude towards mathematics and sciences based on their previous knowledge experience with both fields (70%). This shows the enormous impact of applying STREAM in early education, the effects of motivated STREAM teachers in engaging students to learn, and the influence of high schools that adopt innovative approaches. Kang (2019) reports that student learning outcomes are achieved through STEAM initiatives, correlated with efforts from teachers with effective and affective learning, and supports Popa and Ciascai's (2017) findings of the long-term effects of STEAM education in lower levels, boosting skills such as group work and communication. Susilo et al. (2021) suggest that communicative teaching plays a significant part in improving what is taught in schools.

2.2.2 Creativity and STREAM

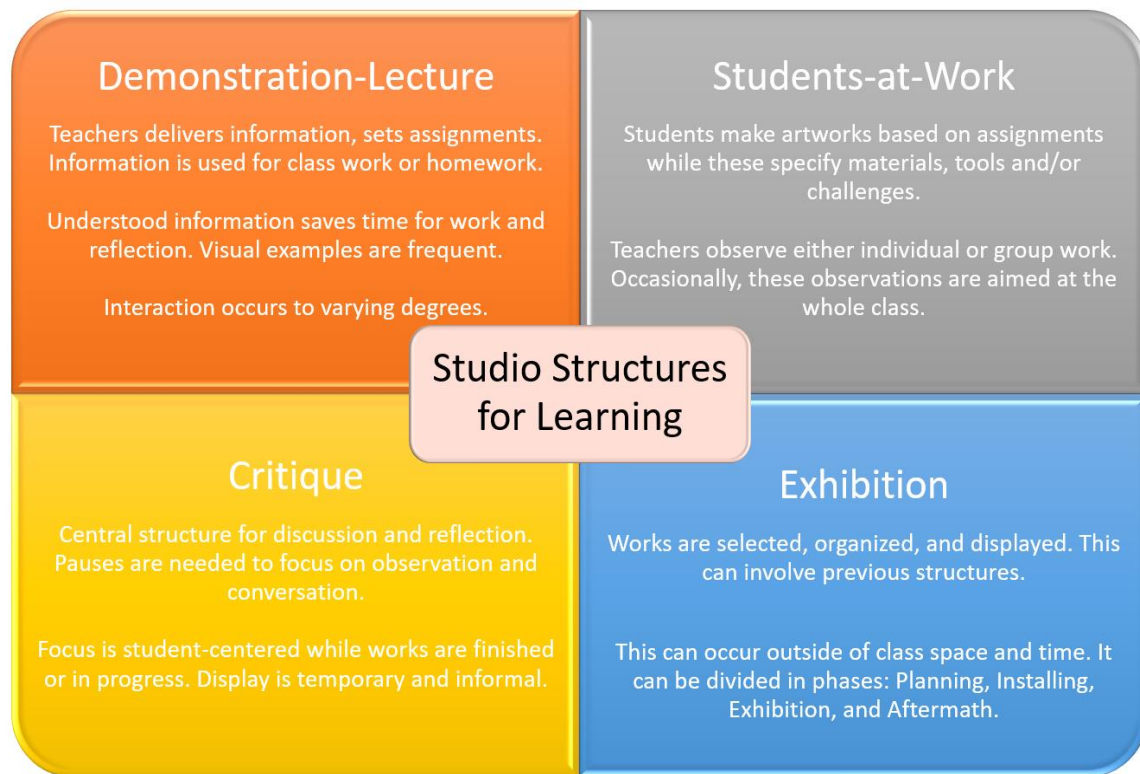
Creativity is the ability to create what is being taught or imagined (Susilo et al., 2021). Conradt and Bogner (2018) cite the development of STEM into STEAM to promote creativity in the classroom, considering its implications on culture and economy nowadays. Effects of creativity on education should not be ignored (p. 238) and, according to Ozkan and Umdu Topsakal (2021) "students must be supported to learn by doing and

experiencing” (p. 113). They argue the possibility of working on creativity by utilizing simple materials, but it is the teacher’s responsibility to be aware of how STEAM education could work easily in the classroom.

It is critical that communication and critical thinking skills are enhanced in learners by including the arts (Thurley, 2016), with Land (2013) stating that “progress does not come from technology alone but from the melding of technology and creative thinking through art and design” (p. 548). This author argues that literacy skills could offer improvements in communication and critical thinking by considering that arts-integrated units can not only help to understand content in STEM but also help learners in their own promotion of literacy skills. Cross-curricular collaboration can help teachers of different fields to ideally apply content and concepts that could have not been treated in the same way if such collaboration were not possible. For example, reading a text about properties of waves and considering that the frequency of a wave is measured in Hertz and expressed as the number of waves that move out every second could lead to a class about measuring waves with a variety of math problems, representing types of waves and how they are perceived by learners with the corresponding impact of this topic on every-day life.

Creative learners live with constant curiosity while questioning and challenging directions (Lee & Lew, 2017). According to their research, skills and characters converge in creativity. Creative skills move around six factors: fluency, precision, imagination, flexibility, sensitivity of thinking, and originality. Creative characters also have six factors: curiosity, sensitivity, immersion in assignments, humor, independence, and problem-solving leadership. These aspects of creativity nurture the generation of new ideas and boost performance that can make an impact outside of the classroom.

Figure 6. Studio Structures for Learning



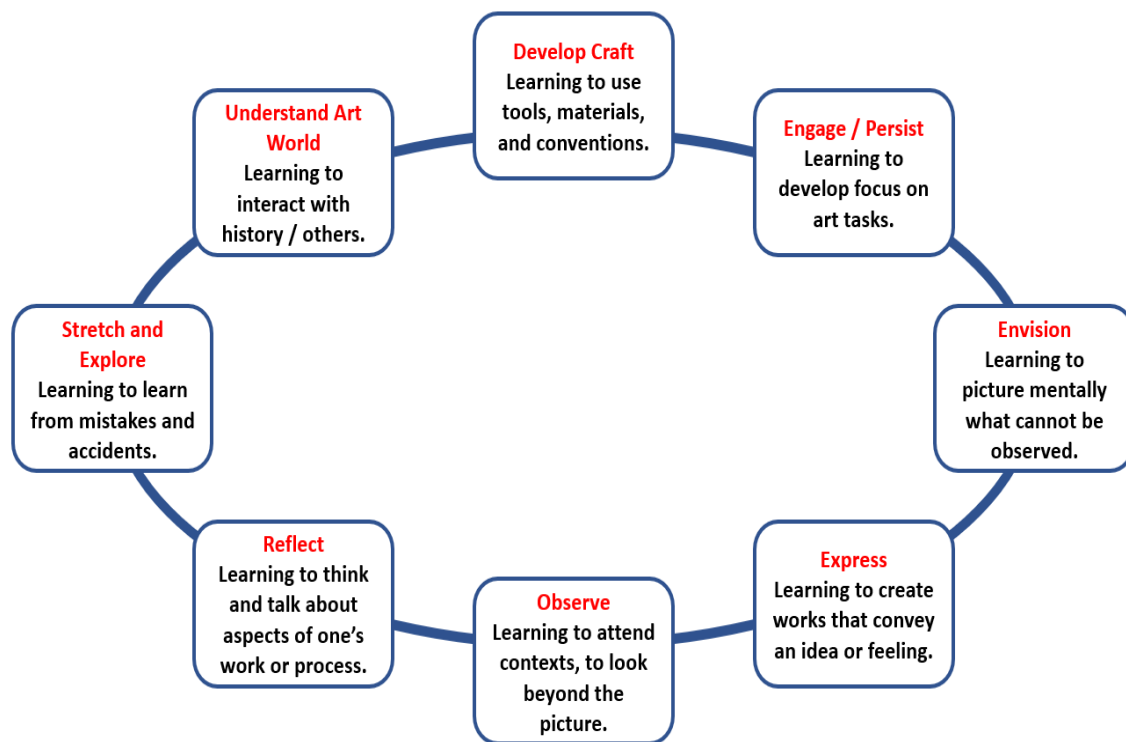
Source: Hetland et al. (2013)

According to Hetland et al. (2013), “the arts are another way of knowing the world-as important as the other disciplines in our societal health” (p. 4), but it is crucial to understand these structures in which the arts can be addressed properly. Their studies have shaped what they call Studio Thinking, divided in two sections: the way learning experiences are seen (Studio Structures) and what learners can do with the information received (Studio Habits of Mind). On the one hand, the Studio Structures for learning explain the way classroom time can be organized by teachers and what learners do on each stage, as detailed in Figure 6, where four of these structures focus on learning:

Demonstration-Lecture (introduction of the topic and general directions), Students-at-Work (learners apply what has been explained), Critique (discussion and reflection time once work is done or in progress), and Exhibition (where work is displayed and observed) while an additional structure explains how transitions are made from one structure or

another. On the other hand, the Studio Habits of Mind are dispositions that “are developed in serious art classes” (p. 7) and prepare the mind for proper work. Although these structures have been designed by visual art teachers, its implications can be applied to teachers from other areas. Figure 7 shows these habits, and the authors make it clear that they are non-hierarchical and can be even juxtaposed.

Figure 7. Studio Habits of the Mind



Source: Hetland et al. (2013)

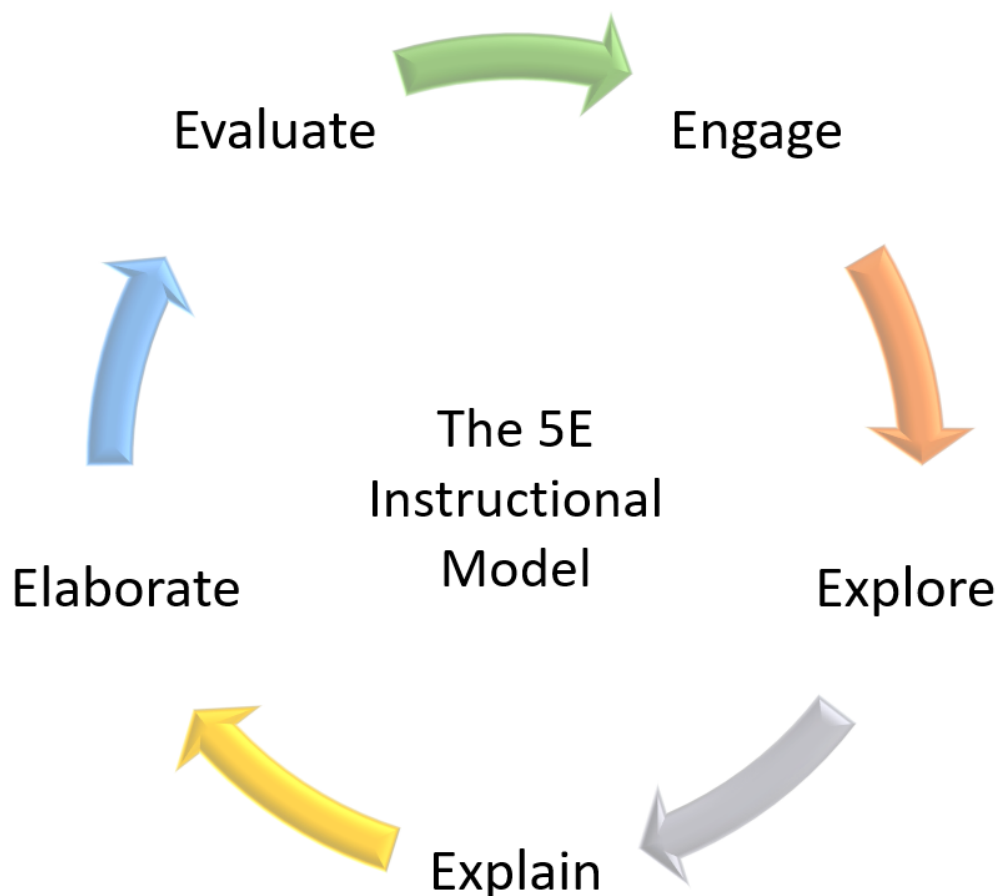
Creativity can also be seen to expand intercultural competence. Based on a theoretical framework that guides the design of an intercultural STEAM program (Chu et al., 2019), students are enabled to collaborate in experiments and explanatory models, creation of art-related artifacts, and discussion with other classmates either in the classroom or online interactions. To that end, the 5E Instructional Model was designed by the Biological Sciences Curriculum Study (BSCS) in the late 1980s to answer teaching demands in terms of how to be more effective while teaching by presenting a more natural

learning process and a more understandable and easy-to-use design (Bybee, 2015).

Applying the 5E instructional model guides students through the following learning activities: engage, explore, explain, elaborate, and evaluate, as shown on Figure 8.

According to Bybee (2015), “integrating the arts and culture in science teaching and learning bring home to students a lesson they are unlikely to learn in traditional” lessons and give them the opportunity to see how other cultures see the same concept or idea that is studied, reshaping their ideas about that concept as a metaphor to see the world (p. 1259).

Figure 8. The 5E Instructional Model



Engage	It initiates the learning task by making connections between past and present learning experiences, anticipating activities that reveal students' thinking.
Explore	It provides students with a base of experiences to identify and develop concepts, practices, and abilities. Cooperative learning can be used to explore the environment or manipulate different materials.
Explain	It focuses on students' attention on aspects related to the previous phases of engagement and exploration. Students can express their understanding of concepts during this phase while teachers can introduce formal labels or definitions for a concept, practice, skill, or behavior.
Elaborate	It extends students' understanding by practicing desired skills and/or behaviors. Deeper and broader understanding can be achieved with cooperative learning also being appropriate for this phase.
Evaluate	It allows students to assess understanding and teachers to monitor progress.

Source: Bybee (2015)

The application of the 5E instructional model to enhance this applicability has integrated arts in various stages. For example, using songs in the classroom provide the way words can be used to express more than regular phrases and that they have a much deeper meaning, increase learners' interests, and have a significant impact on learning by giving time to discuss about attitudes towards something or someone (Shayakhmetova et al., 2017). Shaping cultural identities will help students to redefine their ideas about the world and, at the same time, provide themselves with more creative ways to contribute to their development. Applying songs in the classroom requires a sense of awareness of what students need to hear and what the teacher wants to teach appropriately.

2.2.3 The case of engineering

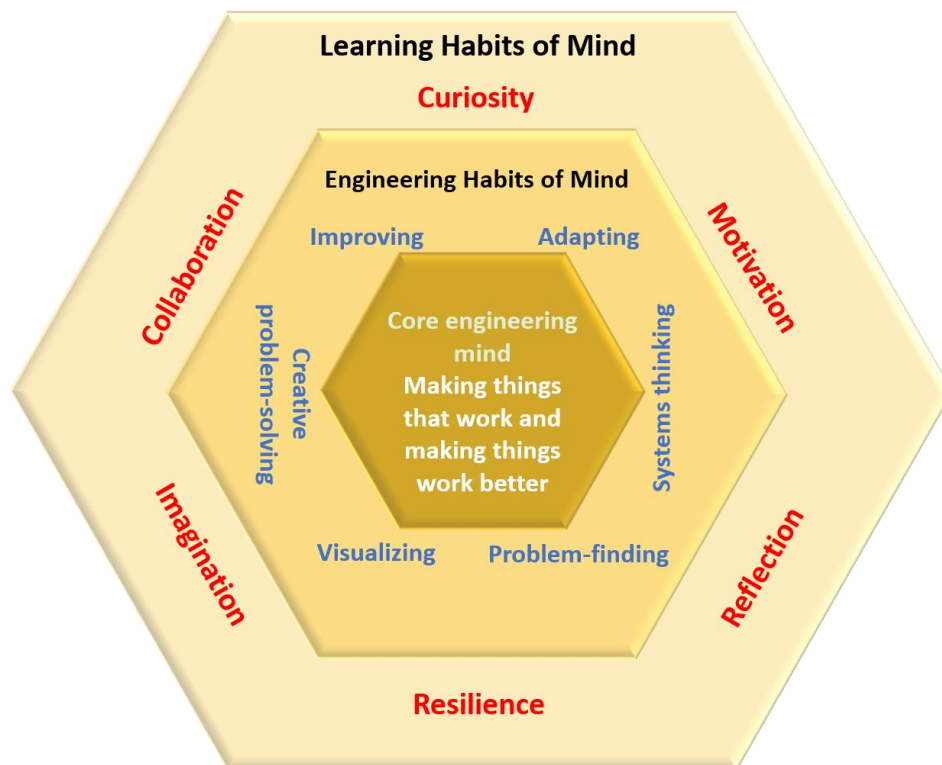
Providing early engineering development needs teachers to have support, considering the natural connections young learners have with engineering demonstrating advanced design and thinking processes. (English, 2018). Although there is a lack of preparedness in the field, teachers are working on this issue. Playing with blocks has been proven to be a successful way to engage young learners in early engineering and STEM concepts (Gold et al., 2020). They state that this framework “describes how children’s block building parallels the way adult engineers think and work” (p. 25) and then compare how they search for innovation, a variety of points of view, and choose an option that helps in problem-solving situations. Additional recommendations are made, such as introducing new materials periodically (sand, cardboard, plastic pipes, and balls), use recycled materials to create new ones (shoeboxes and containers, for example), motivate learners to combine materials in use, with posters or inviting adults to share time with them during block-building. Children can examine an object or idea along with others of the same kind, making connections to get total understanding of it (Kruty, 2020).

Establishing an identity as an engineer is key when learners desire to pursue a career in a related field (Lucas & Hanson, 2016). Their research focused on changing study processes with engineers and teachers to identify six habits that engineers use when they deal with problem-solving scenarios: systems thinking, problem-finding, visualizing, improving, creative problem-solving, and adapting. By calling them the Engineering Habits of Mind (EHoM), it was found there was agreement on how engineers work and think. Lucas and Hanson (2016) suggest that “the problem with the current education system at all levels is that it does not do enough to cultivate the habits of mind required by today’s engineers” (p. 11). Figure 9 details the EHoMs, but the authors make it clear there

are other dispositions that most professionals apply when learning: curiosity, motivation, reflection, collaboration, resilience, and imagination..

Figure 9. Engineering Habits of Mind

Systems-thinking	Seeing systems and parts, making connections and patterns, recognizing interdependencies.
Problem-finding	Clarifying needs, checking solutions, investigating contexts.
Visualizing	Move from abstract to concrete concepts, manipulating materials, mental rehearsals of physical spaces and solutions.
Improving	Experimenting designing, sketching, conjecturing, prototyping to make things better.
Creative problem-solving	Applying techniques from other traditions, generating ideas and solutions with the help of others.
Adapting	Testing, analyzing, reflecting, re-thinking, changing.



Source: Lucas and Hanson (2016)

Quinn et al. (2020) argue the existing link between engineering and technology. Through applications of mathematics and science, engineers can develop new technologies that benefit society. According to their research, “technologies can change the physical nature of the world, where engineering has a direct and explicit impact on society” (p. 887), explaining its direct connection. The desire to create new things and make them work is implicit in the direct relationship engineering and technology have. That said, engineering thinking can never be improved if imagination, creativity, self-confidence, independence, and determination are not found (Kruty, 2020). Early STREAM education with emphasis on engineering thinking benefits young learners in learning of themes and relations of sciences as well as systemic education, critical thinking, communication, knowledge application in real-life situations, and preparation for technological advances. To that end, learning objectives must be determined and engineering concepts in education must be re-analyzed (Quinn et al., 2020).

Engineering can also be boosted by its combination with the arts. Some artistic activities can be connected to engineering design and other fields (Pollard & Olizko, 2019). By citing Belski (2017), they agree that engineering creativity can be seen as an ability to promote new solutions to unlimited issues. They also cite Baron et al. (2017) about the relevance of an art-engineering integration due to the increased relationship between arts and humanities. Giving learners the opportunity to do what they love to do will give them a sense of belonging and will set the stage to apply their creativity in other fields, performing an even better integration (Kruty, 2020).

Engineering often seems overshadowed by the other areas that involve STREAM, despite its enormous contribution to learning in young students (English, 2017). The author advocates for the prominence of engineering in terms of becoming an important aspect that

makes other areas of STREAM work, such as technology and science, and proposes a design where engineering and modelling share common features that can be used to solve problems within the approach, encouraging learners to find the best solution possible. The model is exemplified with details about different types of bridges on one table and samples of these bridges built along with its main features, making students gather in groups to model their possible solutions according to the requirements given in the problem statement. If the nature of both features is respected and teachers are being provided with what they need, curricula that contain more integrated activities “would seem a positive step for advancement” English, 2017, (p. 20).

Changes in engineering education will need a well-designed course sequence to be applied successfully (Strimel & Grubbs, 2016). To avoid consistencies that might exist in the application of a more proper approach with emphasis on engineering, programs such as Project Lead the Way (PLTW) and Engineering Projects in Community Service (EPICS) are initiatives that apply processes aimed at solving problems with the use of engineering in the United States (Kelley et al., 2010). The PLTW, launched in the late 1990s, provides courses to introduce engineering into high and middle schools. EPICS, on the other hand, is a program that focuses team association with not-for-profit organizations looking for defining, designing, building, testing, deploying, and supporting projects that will allow organizations to help communities in a more practical way. Although it started in the mid-1980s as a university-focused program, EPICS-High for grades 9-12 was launched in 2007 to connect engineering with high-schools. The authors indicate that “engineering design curriculum developers must be more purposeful in creating learning experiences that embed mathematical problems and science inquiry activities into the engineering design process” (Kelley et al., 2010, p. 33).

Lucas and Hanson (2016) consider that two approaches are signature when teaching engineering. First, the engineering design process (EDP) takes learners to generate different ideas before selecting a solution. According to research, the EDP is “a pedagogical strategy that requires students to follow a set of steps to create the most effective solution” (Hafiz & Ayop, 2019, p. 677). Hafiz and Ayop cite Berland et al. (2014) to sequence a traditional EDP: defining problem, systematic selection of solution, model and analyzing, and repetition of design process. By applying systematic selection of solutions, they can use STEM content to show evidence of that selection. Second, learning from professionals aims at engaging engineers with teachers to work together in extracurricular activities to support students’ learning, stimulating the connection between learning and the real world and, at the same time, giving the insights of a future career. It will always be important to get more people involved in the education process if their contributions are significant. Although Lucas and Hanson (2016) explain the connections between these approaches with higher education, “they have the potential for application across all sectors of education from primary school onwards” (p. 10).

Implementing active learning in engineering is another focus to consider, as studied by Connor et al. (2015). Project-based activities focused on engineering can be enhanced by the application of active learning “to provide an environment where it is possible for students to become excited, curious, and to take control of their own learning experience” (p. 46). Connor et al. (2015) argue that even though active learning is more appropriate in settings that promote creativity in the classroom, engineering can apply traditional approaches from other disciplines such as the arts to direct learning in the right path. Engineering projects can connect with social studies skills, too, making project-based learning a useful technique, considering that engineering takes place in real-life situations

and there are people involved (Cunningham, 2018). Regardless of how it is applied, students must find ways to use knowledge in a meaningful way that helps acquire total comprehension.

2.3 Impact of the STREAM approach

The implementation of the STREAM approach in the classroom has been found to be beneficial in several important studies. In section 2.3.1, the way the STREAM approach can help to design better lesson plans and assessment is examined, as well as its impact on intercultural learning. The implications of STREAM in how young learners build their own knowledge and how design thinking can help promote a better integration of the arts are reviewed in section 2.3.2.

2.3.1 Lesson planning, assessment, and intercultural learning

As Kim and Bolger (2017) state, an integrated curriculum “has great potential to increase student engagement and learning” (p. 600), but the starting point of an appropriate application of the approach is adequate lesson planning. They found the link between developing STEAM lesson plans and teachers’ thoughts about the approach, especially those related to subject awareness, claiming that successful implementation of STEAM lesson planning is “teachers’ confidence to enact the change” (p. 601). Boice et al. (2021) highlight that collaborative lesson plans make teachers assume responsibility for a proper integration of this approach, but the need for constant support while they go through different disciplines is evident (Dare et al., 2018). The approach seems an appropriate way to master the abilities people need in the 21st century (Diana, 2021). To achieve this, several solutions are offered besides curricular adjustments, such as providing schools with the needed materials and equipment.

The relevance of assessment through the approach is highlighted by Herro et al. (2017) because as it gains space in primary education, appropriate problem-solving opportunities are needed. Assessment is necessary to redesign instructions when collaborative activities are not possible. Kelley and Knowles (2016) have done research regarding assessment and claim students perform better on math assessment when integrated approaches are utilized. Despite this, there are schools that have not adopted measures in assessments towards reaching the pedagogical needs this approach can offer (MacDonald et al., 2019).

Research conducted by Quigley et al. (2020) emphasizes how critical it is to design an approach based on integration, teacher support, and real activities. To that end, research shows the utility of a STEAM conceptual model, based on the misconceptions teachers have about STEAM and the goal of guiding schools with a better implementation of the approach. This conceptual model works on the premise that teachers should consider the ways young learners are already engaged in cross-curricular learning, and it is based on three dimensions: discipline integration (connect disciplines through a problem-based topic), classroom environment (ways in which educators organize classroom to ease problem-solving scenarios), and problem-solving skills (how teachers work with students' abilities with different activities to enhance learning. If the class topic is endangered animals, discipline integration includes science, engineering, arts, and even social studies and ethics), classroom environment signals the relevance of this topic as it is a current threat in the world, and problem-solving skills deal with students' ideas and suggestions to find a solution to the threat. The way this model can be applied enables the approach to be more than a combination of subjects but a means to develop better educational skills and integrating the level of participation from learners and proper assessment.

Intercultural learning has also seen the impact of STREAM and can be successfully applied in cross-culture settings with digital tools. According to research (Shonfeld et al., 2021), skills that are needed for enhancement in learning through digital environments include digital competence, teamwork, interculturality, and lifelong abilities for learning. The Indigenous Education Institute Project is a cross-cultural proposal cited in their work. and it was designed to create interest in space sciences in indigenous and non-indigenous communities in the United States. Students in the Navajo reservation were engaged in activities involving knowing other cultures while teachers made emphasis not only on STEM but STREAM, improving arts and reading skills as well as realizing that STREAM skills should also be developed in teachers before transferring them to students.

2.3.2 STREAM and young learners

The idea of a Fred Rogers' approach to STEM/STEAM has also modeled the way this approach has impacted over the years. Fred Rogers' approach to STEAM lies in inquiry-based learning so that young learners are ready to build their knowledge (Awang et al., 2020). They ask their own questions while searching for answers and connecting what they knew with what they now know. While Fred Rogers' work is often connected to social-emotional settings, its work was about the whole child, or the concept of the whole neighborhood, creating interactions with people, places, and things around the child (Sharapan, 2019). When children are provided with these learning experiences, as shown in Figure 10, it means that STEAM is being approached as it is explained on the table. Applying the approach in pre-schools is highly regarded by Awang et al. (2020), who stated "the actual STEAM skills are mastered when children become confident to inquire about anything and find out the solutions to any problems faced" (p. 1077),

Figure 10. Fred Rogers' approach to STREAM

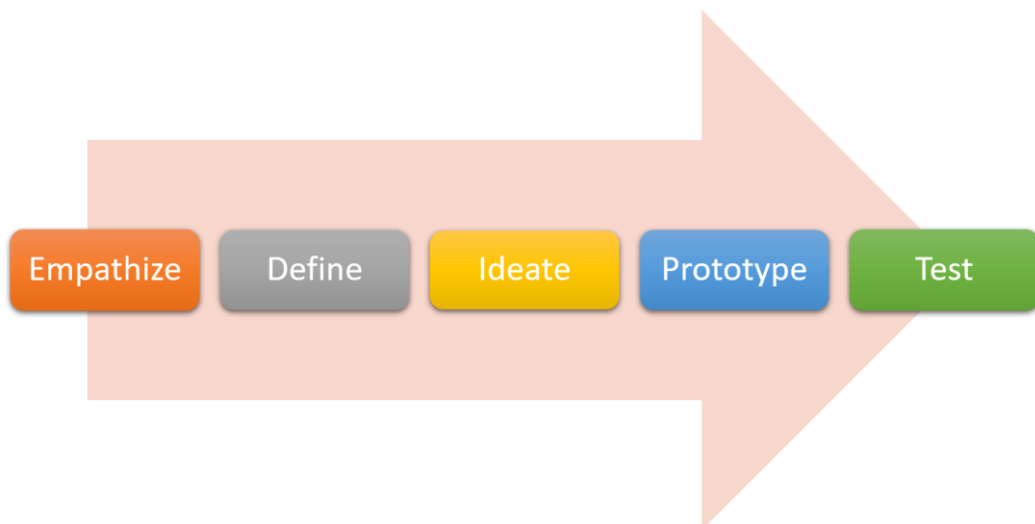
Science	It is about nurturing a sense of wonder and curiosity, asking questions, exploring, and experimenting. In early childhood, science is about everyday experiences, like ice melting, shadows, seeds growing into plants, where animals live and what they eat.
Technology	Technology is just another word for “tools”. While people tend to consider digital equipment as technology, crayon and pencil can be considered part of the same group, like rulers, scissors, and paper clips.
Engineering	It is about identifying a problem, thinking about solutions, and trying them out. Finding ways to build blocks higher or placing paper boats waiting for them to float can be examples of engineering at this age.
Arts	Applying the arts gives elements to illustrate ideas, by drawing or describing words, by experiencing life situations through music and dance. Creativity and imagination play a vital role in problem-solving.
Mathematics	Mathematical abilities include not only numbers: comparing, sorting, patterning, and identifying shapes. Words are another way to express math aspects of life: bigger, smaller, higher, lower, farther, closer.

Source: Sharapan (2019)

Design Thinking to promote arts integration in STEAM is another way this approach demonstrates it is gaining more space and acceptance in educational settings. Design Thinking can expand the approach by creating more opportunities for teachers to develop creative actions that put interdisciplinary efforts in evidence (Henriksen, 2017). The author cites Cross (2011) to indicate that Design Thinking refers to the skills needed towards the generation of ideas and finding solutions to different problems. Figure 11 shows the Design Thinking as a sequential process with the following steps: empathize, define, ideate, prototype, and test. Empathizing means getting familiar with the object of the study and, once this is done, it can be defined to understand how it can work. Ideating refers to the use of what is known about the object of study to create something new, which can be prototyped to analyze possible solutions. These possible solutions may be tested to identify the best outcome. An activity based on recycling can generate Design Thinking as

an example of how it can be implemented. First, it is important to understand the problem, so videos, articles, and reports can help (science and reading might work at the same time) to define it. Next, a campaign that asks people to use recycled materials (i. e. batteries and plastic cars) in toys can lead to the generation of different ideas (technology, engineering, and mathematics can connect) that can even be designed using drawings or sketches (arts). Finally, they can be tested to see if the process ends or needs to be redesigned. The nature of design thinking can reshape the learning aspects of the STREAM approach.

Figure 11. The Design Thinking Model



Source: Author

CHAPTER 3

3.1 Methodological approach

The purpose of this study was to identify the effects of teaching and learning of STREAM on a group of Fifth Grade students from a school in Samborondón, Guayas based on their feelings and attitudes towards this approach, and to use this information to enrich and improve the program. The applicability of the approach selected is discussed in depth in this chapter, as well as participants and procedures.

The research question that determines the object of this study is as follows: How has the teaching of STREAM influenced English language learning on Fifth Grade students enrolled in an elementary school in Samborondón? There are three sub-research questions that support the main one:

1. How do students feel about learning with the STREAM approach?
2. What do teachers do to enhance the teaching of STREAM?
3. How can this approach be improved to benefit both teachers and students?

The goal was to conduct a qualitative research approach that provides insights on how teachers and students feel about this learning approach, how much and in what ways students are learning. Qualitative research offers a deeper understanding of real-life situations by gathering participants, perceptions, and behavior (Tenny et al., 2021). According to Grossoehme (2014), qualitative research often works with written information and interview transcripts to understand the meaning of the participant's experience. Common characteristics of qualitative research include the non-standardized methods of data collection, detailed and complex information, respect for each participant, and reflexivity, which even includes the own researcher (Ritchie et al., 2014).

Using open-ended and closed questions provide data that can be collected for the study while it also allows to integrate participants on a large-scale basis. Interviews, on the other hand, allow researchers “to get firsthand information directly from some knowledgeable informants” (Zohrabi, 2013, p. 255) despite its cost and being time-consuming. Regardless of the instruments applied during a study, they should be valid and reliable. Validity “is a matter of trustworthiness, utility, and dependability that the evaluator and the different stakeholders place into it” (p. 258). The reliability of a research instrument deals with how consistent and accurate the instruments are when applied (LoBiondo-Wood & Haber, 2014)

3.2 Data collection

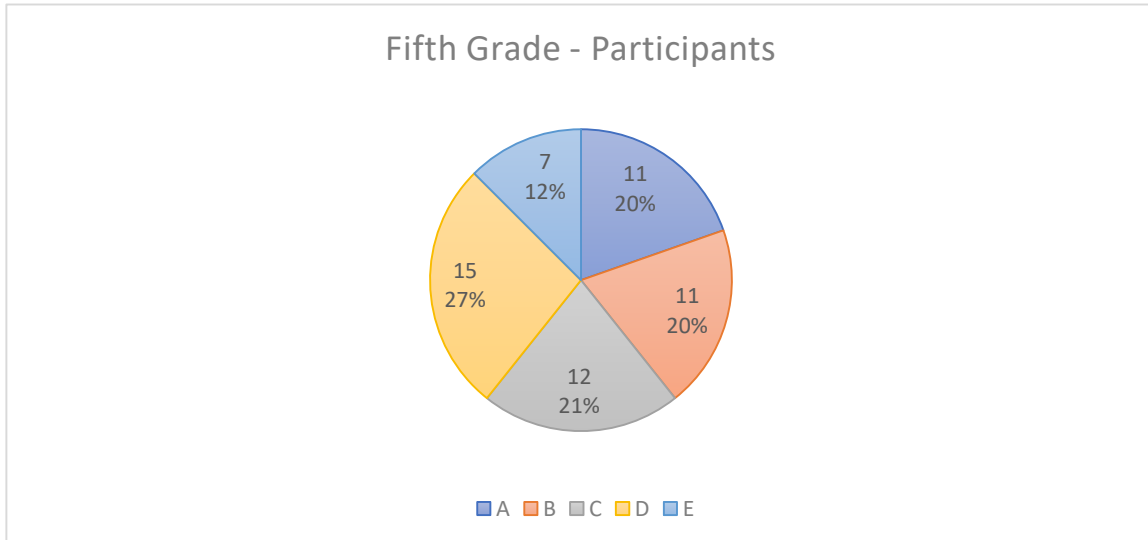
3.2.1 Participants

Students and teachers from the elementary school participated in this study. One hundred and fifteen students are enrolled in Fifth Grade, divided in five groups (Fifth A-B-C-D-E). They have been exposed to foreign language learning through subjects since early educational stages and are considered to have a lower-to-upper intermediate level. Because the object of study is to analyze the effects of STREAM on Fifth Grade students, we will rely on their collaboration. Although the invitation to participate was open for everyone (a participation consent form is shared in Appendix A), the final number of participants from the student’s category was 56 (30 boys and 26 girls), approximately 50% of them all. The distribution of students by grade and gender are shown in Figures 12 and 13, respectively.

Three teachers also cooperated with the study. Working with teachers provided insights into how the STREAM approach was understood and applied in the classroom. These teachers worked at different levels: Fourth, Fifth, and Sixth Grade. Teachers from Fourth and Sixth Grade were selected to know what is expected from them once students

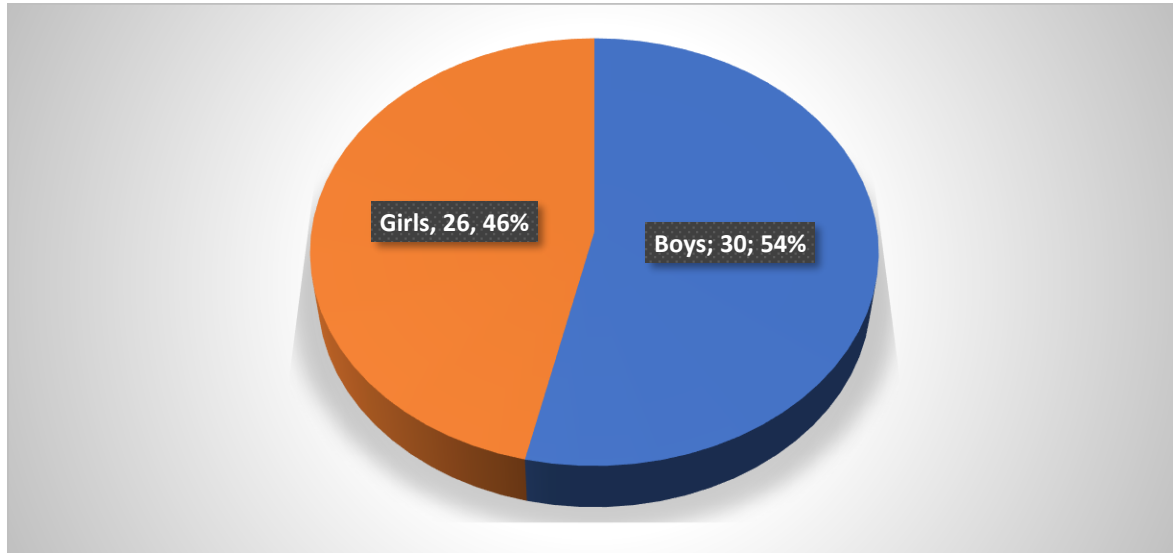
finish Fourth Grade and are ready for Fifth as well as they finish Fifth Grade and are ready for.

Figure 12. Fifth Grade Students – Participants of the study



Source: Author

Figure 13. Distribution of the participants



Source: Author

The English Coordinator for the level was appointed as another participant in the study due to his experience in teaching at early stages and a general overview of the approach is implemented at different levels.

3.2.2 Instruments

3.2.2.1 Questionnaire

For the students, a digital questionnaire was applied (Appendix C). There were nine multiple choice questions and two to expand and support the answers. This questionnaire intended to know students' perceptions and opinions about the STREAM approach and what they considered interesting about the approach (nature and science, history and geography, math, art, design, and reading comprehension), how they felt about STREAM classes when compared to last year's, resources and suggested changes (if any). The participants also provided reasons for their opinion.

3.2.2.2 Interviews

For the teachers who cooperated with the study, interviews were conducted to identify their knowledge of STREAM, how they apply the approach in classes, institutional support, strategies that have proven effective for them, their expectations about how the approach can improve, and their teaching experience in contrast to the approach as well. Virtual meetings were arranged to conduct the interviews that lasted approximately 20 minutes and participants were instructed on the matter before proceeding, with their consent to record each interview. For understanding interview purposes, several categories were created based on the questions used: knowledge, experience, support, students' performance, strategies, expectations, improvement, research, and general perception in comparison to traditional language learning methods. The questions that were used for the interviews are provided in Appendix C.

3.2.2.3 Ethical considerations

It is of paramount importance that research involving interaction with different groups should be informed to avoid ethical issues. Prior to the collection of data, students

and teachers received an e-mail explaining the purpose of the study and they were voluntarily expected to cooperate. The study was conducted in a way that does not produce negative consequences for the participants, who were instructed in how interviews and surveys were going to be applied, ensuring that their personal information would not be disclosed without their permission, along with details that allow them or their guardians to contact the researcher for further information. Participation consents are shown in Appendices A and B.

3.3 Evaluation of the methodology

The number of students selected to take part in the study was based on how many responded to the questionnaire at the time the data was gathered, but the fact that at least 50% of the population met the deadline requirements made this study more reliable. Based on the object of the study, the questions were generated to compare students' progress with last years' and how they see themselves regarding the future. Although gender was not acknowledged as one of the aspects to be analyzed at first, it was considered at the moment of developing the survey to identify differences or similarities in what they like to learn and their attitude towards what and how they are learning.

Surveys and interviews have been chosen as primary instruments of gathering data. Observation was indirect, relying on the teachers who are participants of the study, especially when asking about students' attitudes and their own perceptions while teaching STREAM. The addition of the English Coordinator for the level added more credibility to the data, based on his expertise and a global understanding of the application of STREAM at the elementary level.

At the beginning of the study, Fifth Grade students were e-mailed to inform about the interest of the researcher in them taking part in it. Although the information provided

by them was treated anonymously, it was important to indicate to parents what actions were taken to protect the students' privacy during the collection of data. Participant consents were sent retrospectively to let parents know the object of the study, how the information would be treated, and contact details in case further information is needed. By the time the results of this study were presented, there was not any report from parents refusing to let any student participate.

CHAPTER 4

4.1 Summary of the applied methodology

The study is aimed at identifying the effects of teaching STREAM on a group of Fifth Grade students from a school in Samborondón, Guayas. The research question that determines the object of this study is to find out how teaching STREAM has influenced English language learning on Fifth Grade students enrolled in an elementary school in Samborondón.

A qualitative research approach has been applied to get insights on how teachers and students feel about this learning approach, how much and in what ways students are learning. There are 115 students enrolled in Fifth Grade, divided in five groups (Fifth A-B-C-D-E). They have been exposed to foreign language learning through subjects since early educational stages and are considered to have a lower-to-upper intermediate level. The final number of participants from the student's category was 56 (30 boys and 26 girls), approximately 50% of them all.

For the students, a digital questionnaire was applied to know their perceptions and opinions about the STREAM approach. There were nine multiple choice questions and two open questions to expand and support the answers given. For the teachers who cooperated with the study, interviews were conducted to identify their knowledge of STREAM, how they apply the approach in classes, institutional support, strategies, expectations, and their teaching experience in contrast to the approach as well. The English Coordinator for the level was also interviewed to get an overview of approach in the institution as well as get insights from his teaching experience in the matter.

Participants were instructed in how the information from the interviews and surveys were going to be used. With the information gathered, the analysis of the data was

conducted. Students' findings are presented first. The results are presented and explained accordingly in terms of what they considered interesting about the approach (nature and science, history and geography, math, art, design, and reading comprehension), how they felt about STREAM classes when compared to last year's, resources and suggested changes.

Regarding the interviews, the information presented is based on the following aspects: knowledge, experience, support, students' performance, strategies, expectations, improvement, resources, and general perception in comparison to traditional language learning methods. The data gathered from these interviews will be presented after the students' information.

4.2 Findings

4.2.1 Students' Questionnaire

Table 1. Participants of the study

Fifth Grade	Total of students	Participants	Boys	Girls	% of students who participated
A	25	11	5	6	44
B	25	11	6	5	44
C	20	12	6	6	60
D	25	15	8	7	60
E	20	7	5	2	35
Total	115	56	30	26	48.70

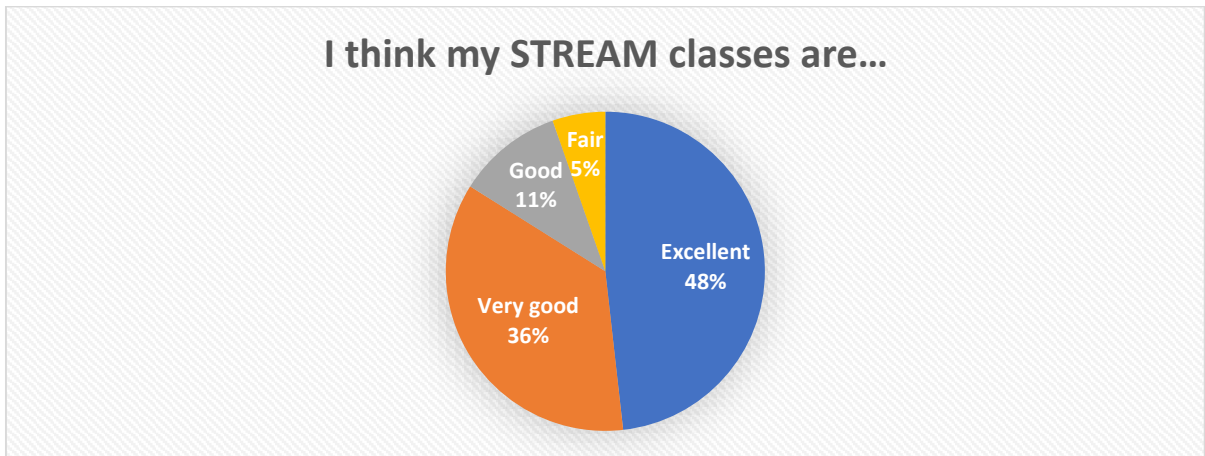
Source: Author

Fifty-six students voluntarily completed a digital questionnaire about how they feel about the STREAM approach. There were 30 boys and 26 girls from five different groups. The findings from the rest of the questionnaire are explained below. Detailed information about participants' responses can be found in Appendix E.

I think my STREAM classes are...

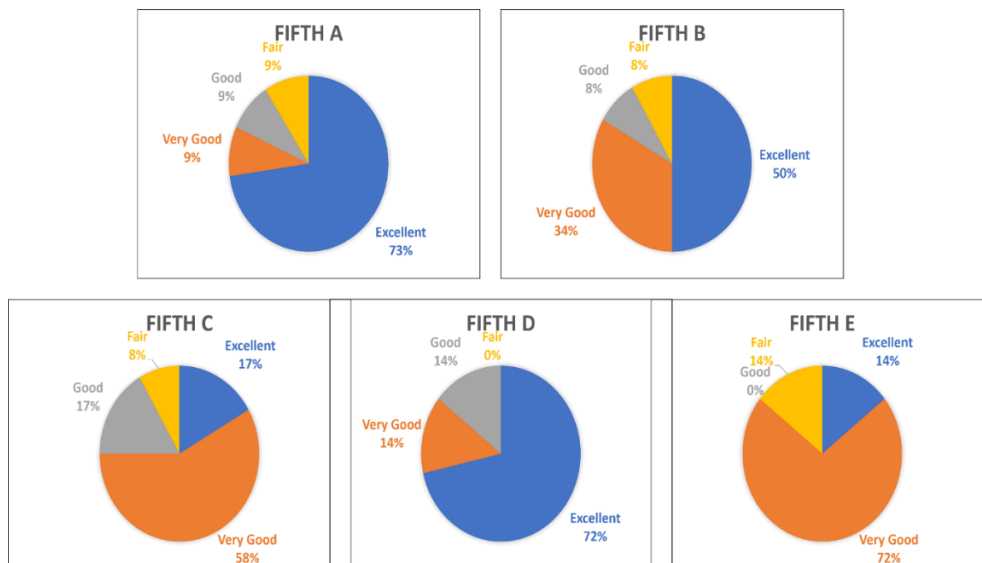
Overall, 84% of the participants responded that their STREAM classes were “excellent” or “very good”, as shown in Figure 14. There were three students who chose “fair” to fill in the statement. Figure 15 shows more of these results in detail. When analyzed separately, Fifth A and Fifth D showed a higher number of participants who chose “excellent” as their response while Fifth C and Fifth E showed “very good” as their primary choice. Fifth B stayed close to the general results.

Figure 14. Students’ perception about STREAM - Overview



Source: Author

Figure 15. Students’ perception about STREAM – View by grade



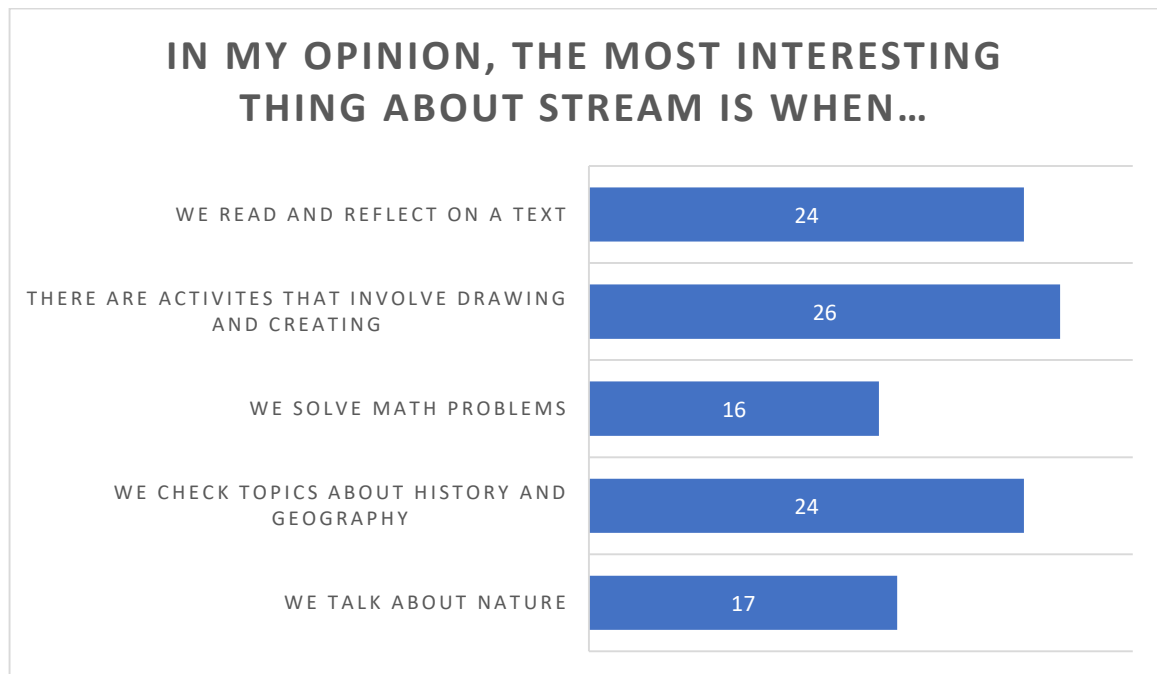
Source: Author

In my opinion, the most interesting thing about STREAM is when...

Students were asked to choose more than one option (if needed) to complete this statement. Twenty-six participants chose “there are activities that involve drawing and creating” as their primary response, followed closely by “we checked topics about history and geography” and “we read and reflect on a text” (24). The least chosen response was “we solve math problems”, as seen in Figure 16.

In the field of gender, the most chosen response by boys involved reading activities (14) while girls chose drawing and creating as their most interesting STREAM aspect (15 responses). The least chosen aspect of STREAM was about math problems with 4 cases among girls and 11 among boys, although boys’ responses are more leveled than those of girls (Table 2).

Figure 16. Students’ preferences in STREAM - Overview



Source: Author

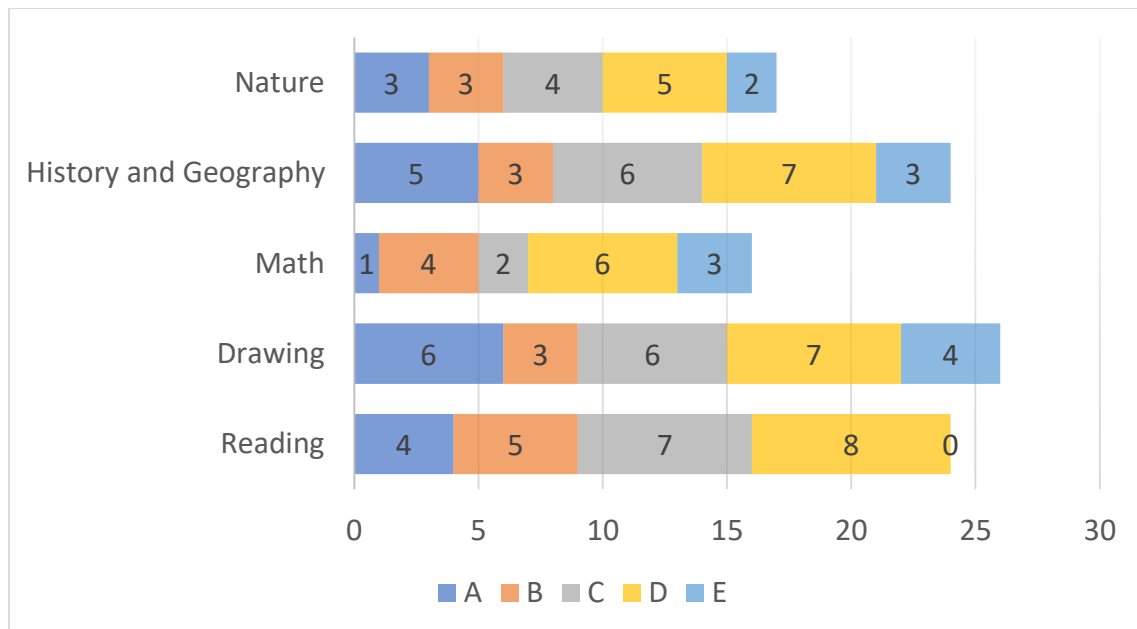
Table 2. Students’ preferences in STREAM – View by gender

I think the most interesting thing about STREAM is when...	Boys	Girls
we read and reflect on a text	14	10
there are activities that involve drawing and creating	11	15
we solve math problems	12	4
we check topics about history and geography	11	13
we talk about nature	11	6

Source: Author

When the information was analyzed per group, it was noticed that Fifth B, Fifth C, and Fifth D slightly chose reading comprehension activities as their preferred aspect of the approach while drawing and creating exercises were the choice of the other groups by a close margin, as shown in Figure 17. There was not any participant from Fifth E who chose reading comprehension activities as a preferred option on this survey.

Figure 17. Students’ preferences in STREAM – View by grade

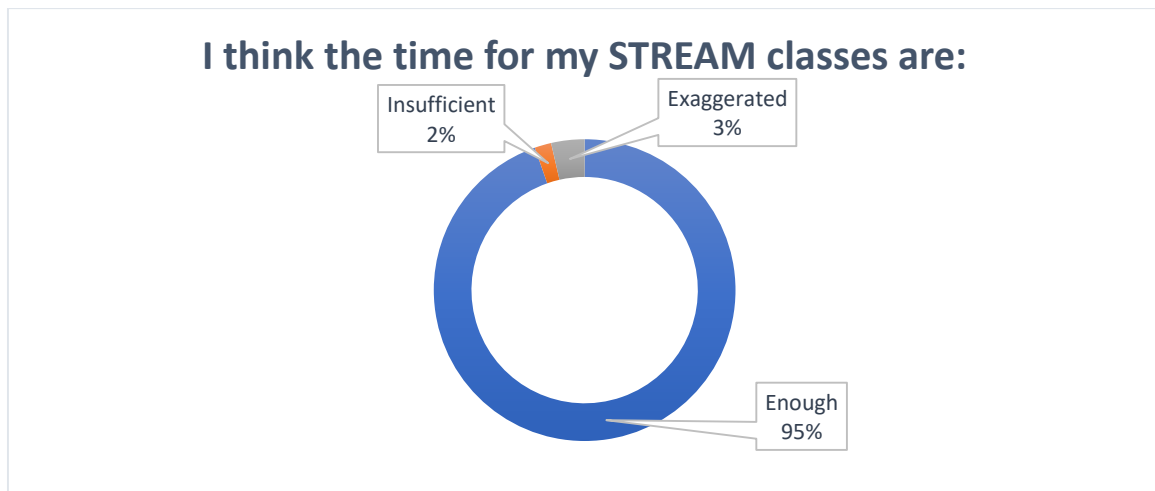


Source: Author

I think the time assigned for my STREAM classes are...

Most of the participants expressed that the time used for their STREAM classes were enough (95%). Two students (one girl from Fifth A and one boy from Fifth E) indicated that STREAM time was exaggerated while one boy from Fifth B argued there was not enough time for STREAM, as seen on Figure 18.

Figure 18. STREAM class time

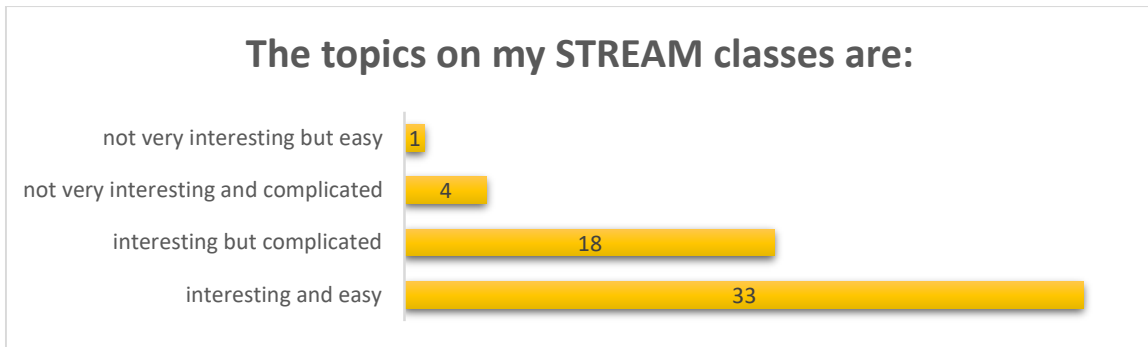


Source: Author

The topics taught in my STREAM classes are...

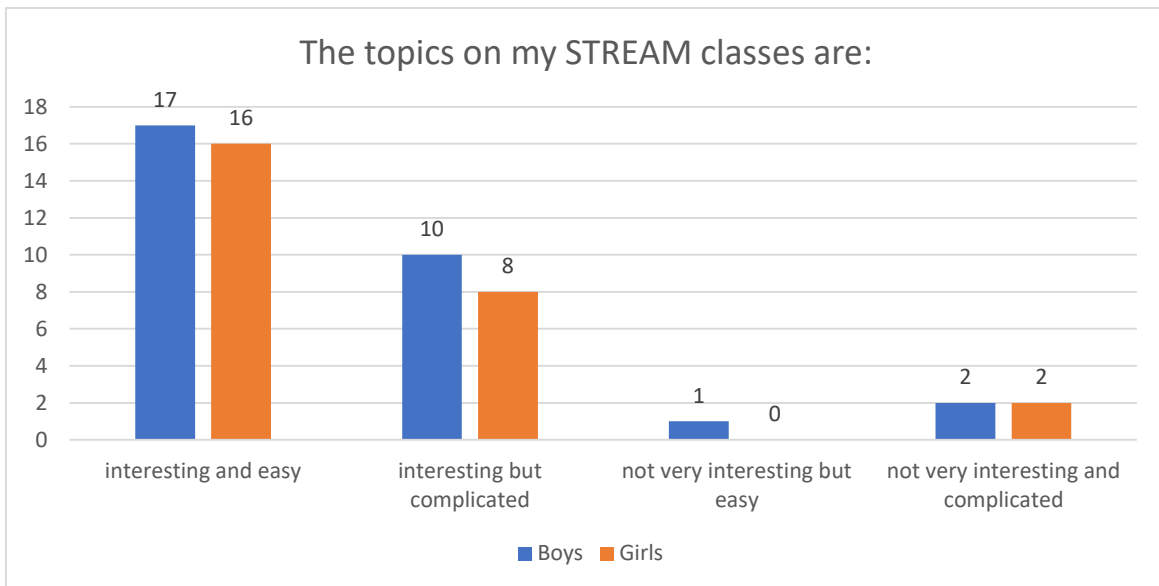
The STREAM approach intends to develop a language learning process when combined with learning subjects in a bilingual environment. Regarding the topics that are part of the STREAM classes at the institution, 59% of the participants reported these as “interesting and easy” while 32% regarded them as “interesting but complicated” (Figure 19). Sixteen out of twenty-six girls and seventeen out of thirty boys also chose the first option as their response. Out of the 18 students in total, ten boys and eight girls considered the second option while two boys and two girls made “not very interesting and complicated” as their choice (Figure 20). Fifth C chose “interesting and easy” above all the other groups (75%) and Fifth E shows a more equal number of responses in some options, as it appears on Figure 21.

Figure 19. STREAM topics and students' opinion - Overview



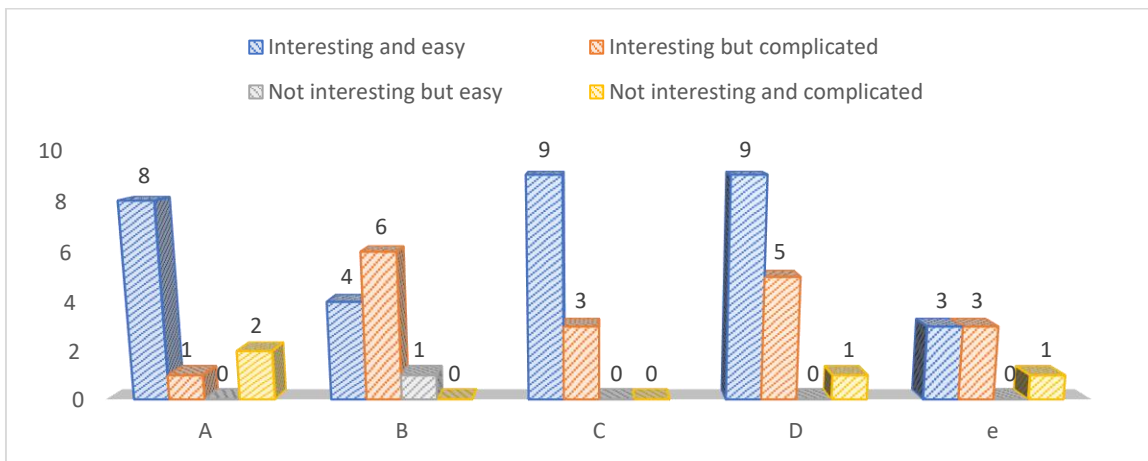
Source: Author

Figure 20. STREAM topics and students' opinion – View by gender



Source: Author

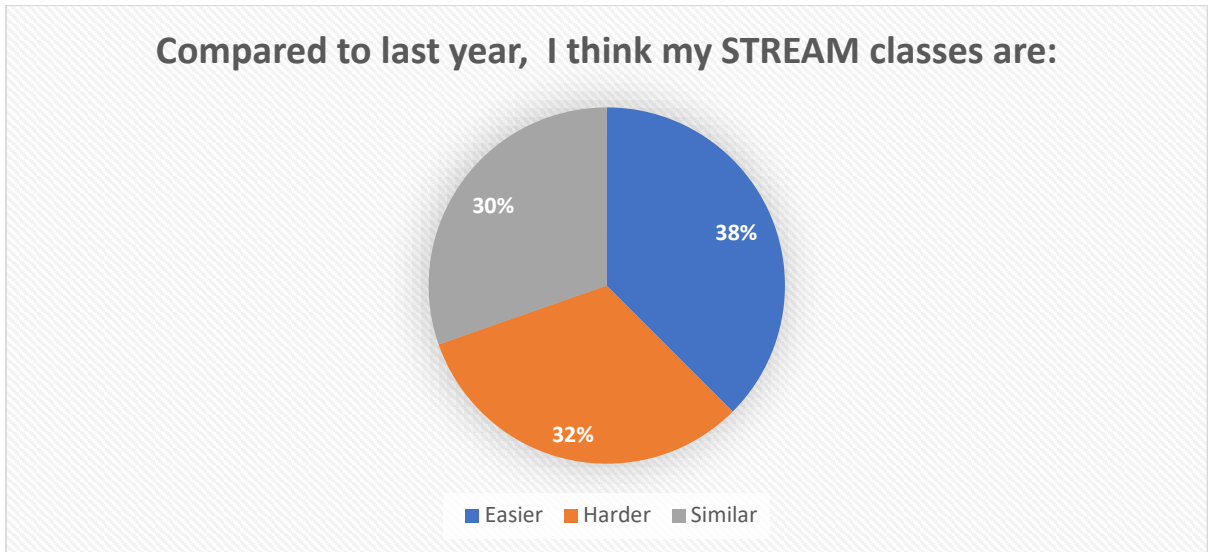
Figure 21. STREAM topics and students' opinion – View by grade



Source: Author

Compared to last year, I feel my STREAM classes are...

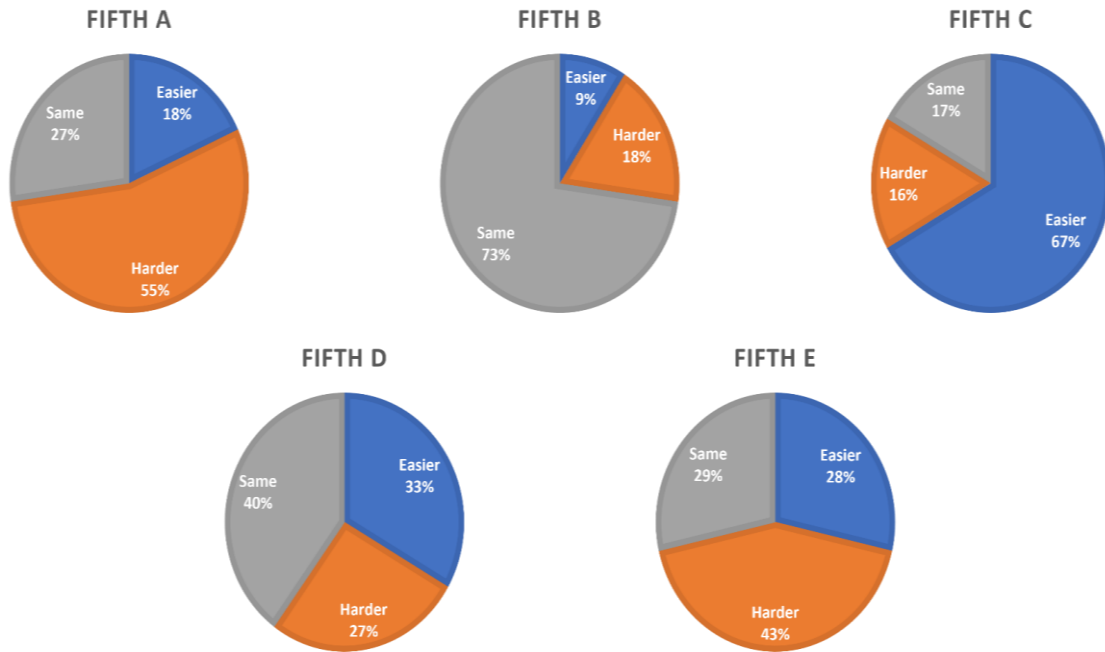
Figure 22. STREAM classes compared to last year – Overview



Source: Author

Students were asked to reflect and compare their progress in comparison to STREAM classes from the previous school year. This question was included to gather perceptions about students' progress and how they feel about what they are learning. Overall, 38% of the participants considered their classes were similar while 32% opined their classes have become easier when compared to the previous school year, as seen in Figure 22. When checked by grade, most of the participants from Fifth A chose "harder", from Fifth B chose "similar", and from Fifth C chose "easier" while the other grades gave mixed answers when completing their surveys, as indicated in Figure 23.

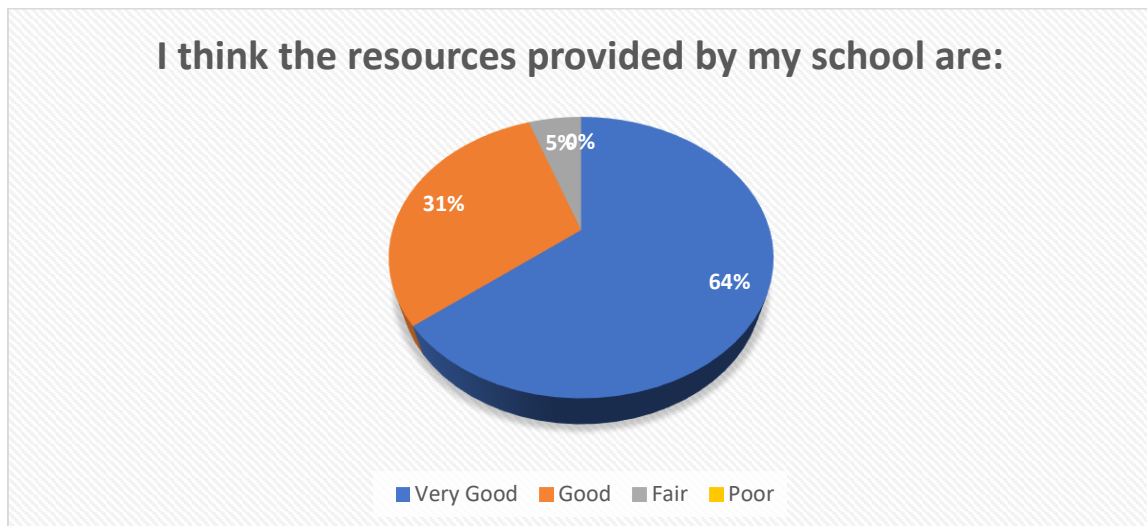
Figure 23. STREAM classes compared to last year – View by grade



Source: Author

I think the resources provided by my school (technology and textbooks) are:

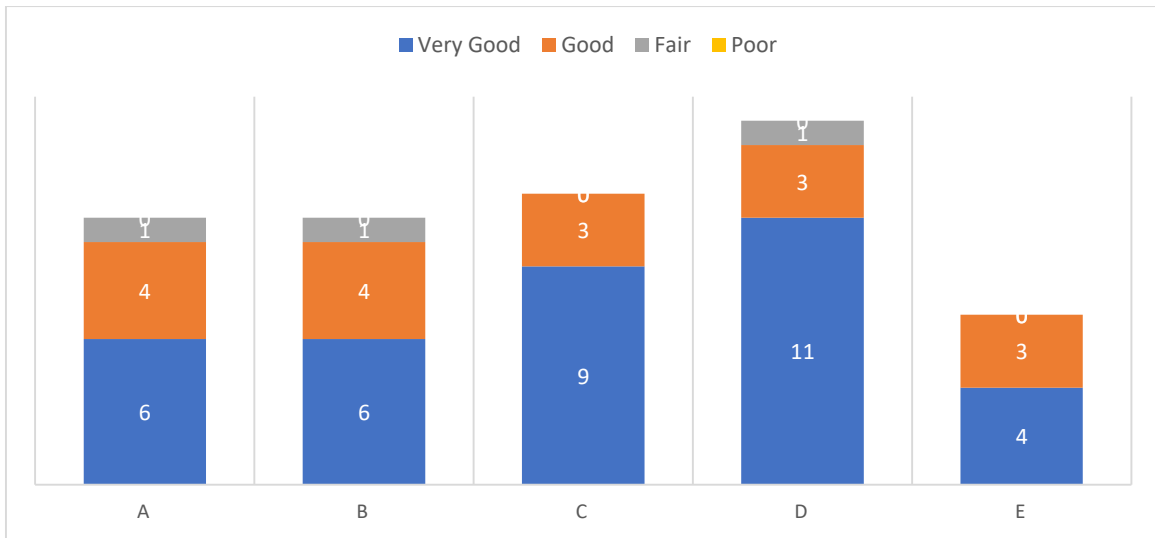
Figure 24. STREAM classes and resources – Overview



Source: Author

When participants were asked about resources, 95% of them answered “very good” or “good”, as illustrated in Figure 24 while 75% of those who identified as part of Fifth C did the same (as seen in Figure 25). No participants chose “poor” on this questionnaire.

Figure 25. STREAM classes and resources – View by grade



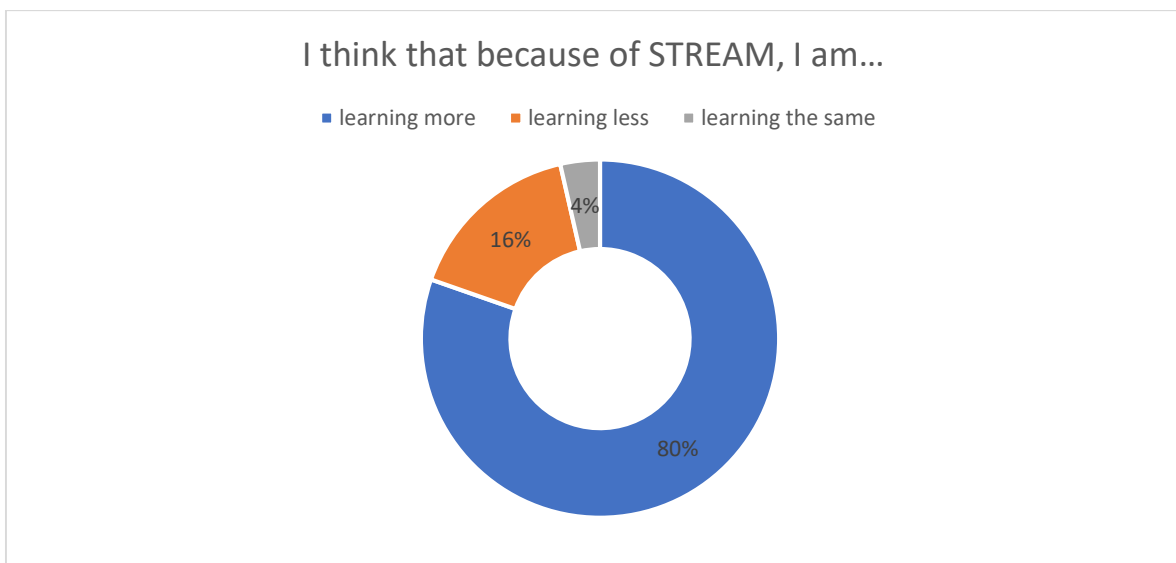
Source: Author

I think that because of STREAM I am...

Explain your answer

Participants expressed they are learning more English (80%). Additionally, they were asked to provide an explanation for that answer. Figure 26 shows some of these responses.

Figure 26. STREAM perceptions about learning



Source: Author

Figure 27. Opinions about STREAM

Fifth	Boys	Girls
A	“I have learnt thing I had never seen before” “I learn new words all the time” “Vocabulary comes with interesting information”	“Activities are easy for me” “There is more vocabulary now” “STREAM was easier last year because our teacher let us speak Spanish”
B	“It is still hard for me to learn” “Interactions make learning easy” “My teacher always helps me”	“My teacher explains clearly” “There are topics we had not checked before” “I did not understand anything”
C	“There are more interesting topics this year” “We are not doing every exercise on the book” “There are synchronous activities now”.	“I think I am learning more because I am speaking better” “I understand what I am learning” “My teacher knows how to explain”
D	“I learn more vocabulary and I read better” “I like that I am learning new things” “It is all more organized now”	“We are learning a new topic every class and that makes learning hard” “Classes are more interesting” “Each class is an opportunity to learn”
E	“It is still hard for me to learn but I am trying” “Thanks to STREAM I am improving”	“I am amazed by the things I learn” “There are more class hours”

Source: Digital questionnaire

If I had to change something about my STREAM classes, that would be...

When participants were asked about what could be changed from STREAM, 26 replied they would not change anything, and some of them expressed their thoughts on why they chose that option. On the other hand, nine participants reported they wanted more interactive activities that involve games, creativity, and exercise on the students’ Moodle

platform while four participants were concerned about the weekly STREAM classes, wanting to add more hours to the schedule. Three participants also reported wanting to check more topics about history and science, and others implied classes were hard for them, so they would ask teachers to speak Spanish or translate during classes. A detailed report of these responses can be found in Appendix E.

4.2.2 Teachers' Interviews

There were four participants in the online interview sessions: a fourth-grade teacher, to know what is expected from students before fifth grade, a fifth-grade teacher because this is the level that is part of the study, a sixth grade, to check on students' progress, and the English Coordinator that oversees work on fifth grade. When teachers were interviewed, a questionnaire was used, as shown in Appendix D.

The information was reviewed and analyzed and is now presented based on the following aspects: knowledge, experience, support, students' performance, strategies, expectations, improvement, resources, and general perception in comparison to traditional language learning methods. To identify the four participants in the interviews, they will be identified as follows: Teacher 1 (Fourth Grade), Teacher 2 (Sixth Grade), Teacher 3 (Fifth Grade), and Coordinator (for the English Coordinator for Second, Third, Fourth and Fifth Grades). Transcripts of these interviews are shown on Appendix F.

Knowledge on STREAM

Teachers 1, 2, and 3 expressed their doubts and concerns before STREAM was implemented because they did not know anything about the approach. Teacher 1 recalled the institution used to have a subject called Science which worked independently from English (in fact it was taught by a different teacher) but connecting them was not made until STREAM was implemented. Teacher 3 remembered being optimistic about the

approach, despite not having a whole idea of what STREAM was. Teacher 2 compared it with the Content and Language Integrated Learning (CLIL) approach, which works on the premise that languages can be learnt through content, while expressing their doubts about how STREAM could be effective in young learners, based on her own experience working with CLIL in another institution. The coordinator reported being familiar with STEM and STEAM, so he thought that adding Reading to STEAM could be more beneficial in terms of a more general and global context rather than working separately.

Teaching experience and STREAM

The coordinator relied on his experience as a STREAM teacher to assure that, with teachers' dedication, the approach has been proven effective in the institution, a thought he sees is reflected in the teachers under his responsibility, highlighting students' internalization of knowledge in each of the areas of the approach. This idea of dedication is shared by Teacher 3, who indicated that it was always good to go beyond the pages of the textbook and search for more information that could be more meaningful, despite having been online for more than one year. Teacher 1's experience with STREAM has been more positive, noting that students felt more connected because subjects were not isolated as they used to with Science and English. Teacher 2 reported being more skilled during STREAM classes and, despite insisting on her idea that implementing STREAM was not ideal in young learners due to students' need to reinforce vocabulary, she feels she is handling everything better.

Institutional support

Teachers from fifth and sixth grades reported not being part of any training session or support from the institution towards the implementation of STREAM in their classes. Teacher 2 noticed it was her intrinsic motivation that took her to prepare herself

better for her classes and did not remember any kind of help during the early days of STREAM. Teacher 3 had the same opinion but highlighted the importance of being a teacher who tried to do his best despite mistakes that can be made. The coordinator remembered the school showed teachers the tools and the possibilities, but he also noted that, in the end, it is up to the teacher to stay updated with “the spirit of a researcher”. A different response was given by Teacher 1, who stated she was part of meetings, seminars, and workshops. She also considered experience as a significant part of a teacher’s work, especially when working with a textbook that needed to bring to the reality of the students who would use it.

Students’ performances

Coordinator indicated that it has been positive to see students performing better, although internalization of knowledge, as mentioned by him, does not happen in all students at once, because they learn new things in different ways. Teacher 3 called on teachers to be aware of the way students are learning today because they know more now. A more pragmatic view was shared by Teacher 2, realizing students could connect different topics or stories to make their own knowledge. Teacher 1 noted how important it is to teach without focusing on the grade rather than focusing on teaching for life.

Strategies

When asked about strategies and techniques that have been proven effective while teaching English through STREAM, Teacher 1 mentioned that organizing group work and creative activities have worked for her, citing the joy in students when they know they are doing something they can connect to a topic they are learning. Teacher 2 recalled that prior knowledge could make learners connect the main topic with information they already know, especially in Social Studies while working with objects they could manipulate, and

associate could work better in science. Teacher 3 indicated his main strategy was to always speak English, mentioning an English teacher should be an English teacher inside and outside of the classroom.

Expectations

Teacher 1 was asked what was expected from fourth graders once they finished the school year. She mentioned some aspects, such as the ability to perform orally, with a basic competence of grammar that allowed to communicate and write. Teacher 2 was asked what is expected from a fifth grader once sixth grade begins. She recalled that one of the aspects that she expected was their ability to identify main ideas from a text, considering that there is a lot of information provided by the textbook. She has noticed during classes that students struggle to find the main points of a text, although when there are information questions involved, they mostly answer correctly.

When asked about this matter, the coordinator indicated that, even though there are coordinators at different levels, they are always sharing information regarding students' needs, how much they have learnt, and what to reinforce or strengthen. Teacher 3 expressed his desire to be in face-to-face sessions, considering that it is difficult for him to help a student remotely, although he believed students are learning more and better nowadays.

Ways to improve STREAM

About this topic, answers varied from one interviewee to another. Teacher 1 focused on the lack of supporting materials available from the institution to develop her work, indicating that teachers do most of this job themselves. Teacher 2 called for reducing the amount of information from the textbooks used in class. Teacher 3 did not call for something similar but selecting specific topics from the curriculum to focus on during the

school year. The coordinator's desire was to make students the main characters of their own learning, wanting them to do research that could enhance prior knowledge and be ready for STREAM classes.

Resources

Teacher 2 mentioned it was necessary to have resources that focused on language development, which in her opinion is grammar. She indicated that learning through content was important but for her it was more determining to work on grammar first. Teacher 3 claimed he was satisfied with the classroom resources although internet access in the classroom could help classes be improved. Teacher 1 also agreed on the internet issue, noting that by doing so, students could do research individually and in groups, but added that some equipment was outdated and needed to be replaced.

General perception

All the interviewees agreed on the idea that students are learning more nowadays. Teacher 1 valued art as a way to connect topics with students' reality as well as the opportunity to use a topic to relate to different areas of knowledge. She called for teachers to be ready for students who can easily find new information and new things to learn. Teacher 2 claimed students liked science topics, but online classes had prevented them from increasing their motivation towards science. She also cited Social Studies as an opportunity to relate to their roots and community. Teacher 3 expressed that STREAM made learning a global approach, making it possible to know what has happened in other countries and compare those events with those happening around them. The coordinator valued the teachers' efforts to make classes more interesting for students, and the effect that it produced in young learners that could transform a boring topic into something fun.

Interviewees were also asked if a more traditional approach could have space on STREAM or if they were not compatible and should not be applied. They all agreed both approaches are different, so combining them could be done under some conditions. The coordinator stated that evidence that the approach is working is that there were more students with English certifications of B2 or higher, but also considered memorization and repetition could not be totally ruled out. Teacher 3, although expressing his efforts to always speak English, mentioned it was sometimes necessary to use translation so students can connect one language with another and take it from there. Teacher 2 indicated actions had been done to improve language learning and, although learners do not speak the English she expected, she celebrated that effort from students.

CHAPTER 5

5.1 Discussion

The object of this study was to identify the effects of teaching STREAM on a group of Fifth Grade students at an elementary school in Samborondón. This chapter contains information that will help answer the research question: How has the teaching of STREAM influenced English language learning on Fifth Grade students enrolled in an elementary school in Samborondón?

Findings are analyzed through the following aspects: students' perceptions and motivations to learn with STREAM, students' recommendations to enhance the STREAM approach, teachers' perceptions about STREAM, and strategies and expectations with STREAM. All these aspects will help to identify the effects of STREAM in both teachers and students and how improving the approach will be beneficial for all the members of the educational community. Drawing from these discussions, this chapter also offers some conclusions for the present study.

5.1.1 Interpretation of the findings

Sixty participants (fifty-six students, three teachers, and one coordinator) voluntarily took part in this study. The interpretation of the findings has been divided into four sections, two of them focus on the students and the other two sections are about the coordinator and the teachers (one from Fourth, Fifth, and Sixth grades).

Students' perceptions and motivations to learn with STREAM

The fact that 84% of the participants regard their STREAM classes as excellent or very good shows they have a positive attitude towards STREAM. The results were similar when students were divided in groups. These are students that have been immersed in the STREAM approach since early educational stages, reinforcing that when students learn

sciences intensively, their views on STREAM are different from those who do not (Popa & Ciascai, 2017).

These perceptions are also supported when they overwhelmingly express a positive attitude towards the time and resources used for their STREAM classes. The results suggest that teachers have made good use of the materials provided by the institution, designing relevant materials for their level, as suggested by Quigley and Herro (2016). Students' comments indicate that they support the work that has been made through STREAM, especially the 26 (almost 50%) who indicated they would not change anything from their classes, complimenting teachers for helping them, speaking clearly, and improving vocabulary. It is hoped that these responses are indicators of attitudes which, if sustained, can have a positive long-term impact on affective and effective learning, as Kang (2019) claims.

Students feel more motivated by activities that involve drawing and creating during STREAM classes. The result supports a claim by Mubarok et al. regarding the connection art has with the other components of the approach (2020) while also reinforcing Daugherty's (2013) assertion that the STREAM approach has provided to refute the idea that arts and science are taught separately. Further study could examine to what extent STEAM education improves students' scores in terms of verbal and figural creativity, as reported by Ozkan and Umdu Topsakal (2021). Reading and activities related to history and geography were placed behind the arts in the responses to the digital questionnaire, implying that students are feeling motivated by the information provided by the textbooks. Overall, thirty-three participants indicated that the topics that are taught in STREAM are interesting and easy. Lefever-Davis and Pearman's (2015) claim that a curriculum that

successfully joins a problem-solving approach with literacy components enhances student motivation and interest in STEM-related areas.

One notable aspect that the results showed was that boys and girls chose a different primary response. While girls chose art-related activities as their most interesting characteristic of STREAM, boys chose literacy-based activities. This aspect supports a claim by Iyer (2017), that there is a difference in what motivates boys and girls while learning as well as research by Land (2013), which indicates that including a focus on arts help more students understand content and promote students' own literacy skills.

Students' opinions and recommendations to enhance the STREAM approach

Eighty percent of the participants who responded said they were learning more English, and the results indicated why they might think that way. Most of them praised their teachers for their efforts in working on subjects in English, highlighting reinforcement in vocabulary and interesting topics as the most important aspects of the STREAM classes. Students' opinions on this matter support claims from Bărnăuțiu-Sârca (2021) that despite the amount of information needed for this approach to work, an integration of these subjects can be considered a way to reshape teaching math and sciences, as well as from Alatas and Yakin (2021) who suggested the effect on problem-solving are positive despite of the time needed to be implemented effectively. These results can also be considered a reflection of what students have faced over the years throughout STREAM classes, so they are now feeling more confident about what they know and the way they are learning. The praise from vocabulary learning is likely to be tied to the reading time STREAM classes contain as well as evidence found by Hubbard (2021). that literacy development is key when wanting academically successful students who can apply strategies provided by teachers to for engaging with different types of texts.

Students were also asked to indicate if they wanted to change something from their STREAM classes. Twenty-six of them responded “nothing” or similar (it was designed as an open question). The feelings of confidence and pride in what they are doing and learning make them support the STREAM approach because they think it is working. It seems that learning behavior, curricula, and assessment have been mixed positively, in line with claims by Nuangchalerm et al. (2020) that a better integration of different areas is possible if aspects are analyzed beforehand. Other students’ responses called for more class hours, more interactive activities during synchronous classes, and face-to-face sessions to enhance learning and cooperation. These results indicate that the ongoing COVID-19 pandemic has its own effects on the way students are learning, feeling the need to be in the classroom again, or wanting to be more connected with their classmates and teachers.

Teachers’ perceptions about STREAM

Anecdotal reports indicate that doubts and concerns about the approach were expressed by teachers before the implementation of STREAM, based on their own ideas of how education should be and because of lack of familiarity with what STREAM stood for. Another aspect this report shows is that teachers feel the initial workload to get familiar with STREAM made them feel struggling with its application in the classroom, a challenge that was found in research by Dare et al. (2018). Those doubts appear to have largely been overcome, and today, they consider their experience with STREAM to be more positive than it was in the beginning. This aligns with Kennedy and Ordell’s (2014) claim that when curricula are designed to engage learners, teachers are encouraged to find opportunities to learn and apply new content. The positive change that teachers report also

supports Kim and Bolger's research (2017), which suggested that teachers' intrinsic motivation to make changes possible is the key to successful lesson planning.

Teachers expressed they had not been part of any proper training before applying the STREAM approach in the institution. Henriksen (2017) called for greater support for teachers to achieve a better integration of the various strands of STREAM. It is positive to note teachers' efforts to improve their ability to implement the approach effectively despite the lack of induction. This positive attitude matches students' feeling of pride and support for what they are doing in the classroom. Ozkan and Umdu Topsakal (2021) emphasized the teacher's responsibility for creating the conditions for the STREAM approach to work easily in the classroom, and it appears that this has been a factor in the positive responses of participants in the survey.

Strategies and expectations with STREAM

When asked about strategies they think should be applied to implement the STREAM approach in the classroom, they all agreed on two things: firstly, that STREAM has a positive effect on connecting what happens in the classroom with aspects of students' environment; secondly, the importance of prior knowledge and how the use of English can help enhance knowledge. As Susilo et al. (2021) suggest, communicative teaching takes a significant part in improving the quality of what is taught in schools.

Regarding expectations, teachers expressed their desire to reinforce literacy skills, especially written skills. It is notable that many student participants stated that they enjoyed literacy skills activities. This suggests that there is not always a correlation between enjoyment and full achievement of learning objectives, but also that in this institution, more attention could be given to this need without creating a negative affective impact. The reinforcement in use of graphic organizers as a way to enhance writing can

prove Lefever-Davis and Pearman's (2015) claim that they offer an effective and practical way to see how information is connected and at the same time promote strong steps towards being literate, in other words, competent enough to interpret information that comes from a variety of texts.

5.2 Conclusions

This study aimed to determine the effects of applying the STREAM approach in Fifth Grade students in an elementary school in Samborondón, Ecuador. After using a digital questionnaire with students and interviews with teachers, sixty participants voluntarily took part in the study, comprising 56 students, one Fourth Grade teacher, one Fifth Grade teacher, one Sixth Grade teacher, and the coordinator for the level. The data was then gathered and used to establish what students and teachers think about STREAM, how much English students perceive they are learning, what teachers are doing regarding the implications of the approach, and what could be done to strengthen and improve STREAM in the future.

Students have expressed their support for STREAM and the contribution for their improvement in language learning due to the combination of activities aimed at developing problem-solving abilities, creativity, and comprehension. The majority of learners consider STREAM as an important influence in learning English as a Foreign Language, describing the process as enriching, interesting, and effective.

Recent research has shown that applying STREAM in the classroom demands curricula that engage learners in more integrated activities (English, 2017) and teachers who assume responsibility for a proper integration of the approach (Dare et al., 2018). Applying STREAM has emerged as an important element in education because citizens are now being prepared to use sciences in their professional future (Zsoldos-Marchis &

Ciascai, 2019) Current findings indicate intrinsic motivation and the intensive use of English have played an important role in the success of the STREAM approach in the institution. As Hapidin et al. (2020) found out, applying STREAM makes learning meaningful and easy to organize.

Despite generally positive responses, some participants expressed their desire for more face-to-face sessions to enhance learning. These results, effects of the COVID-19 pandemic in education, call for decision-makers to act into designing strategies and plans that allow learners to enjoy more dynamic STREAM classes and teachers to develop methodologies that enhance the curriculum. Initiatives such as the Design Thinking (Henriksen, 2017) and the 5E Instructional Model (Bybee, 2015), especially when working on school projects that acknowledge engineering as a tool to design and be creative, can help in the process. Boice et al. (2021) highlight that collaborative lesson plans make teachers assume responsibility for a proper integration of this approach, but the need for constant support while they go through different disciplines is evident (Dare et al., 2018). It is also necessary, as suggested by El-Deghaidy and Mansour (2015), the implementation of a school culture around STREAM, which requires the collaboration from stakeholders to build a more supportive community.

5.3 Limitations

As with any study, it is important to recognize that there were several limitations. This was a qualitative study of the perception of a group of students and teachers working in a specific educational context. Although all the studies are limited by situational factors, in this case it is not possible to make a direct contrast with a group of learners not receiving classes with the STREAM approach, or another group of learners in a very similar social

context who were also receiving the STREAM approach. For various reasons (ethical, economic, and practical) it was not possible to create a control group.

Moreover, in this study the information in this study was analyzed using qualitative methods and the impact of the approach was studied by measuring the perceptions and attitudes of students and teachers rather than academic results. Attempts to quantify learning are in themselves always limited but can sometimes be used alongside qualitative results to triangulate findings.

Responses were received by more than fifty percent of the total population of students who were invited to participate. This sample provides useful information which can be used by administrators and teachers within the institution, and for further comparative studies. However, at the present time, it is not possible to generalize the results further, although it has been possible to interpret the results alongside the existing literature and this can provide implications for further research.

Finally, it is important to recognize that the last eighteen months have seen an upheaval in what humans consider normal. In more direct relation to this study, participants' responses could have been influenced by their experience of receiving classes online, in their homes, during the COVID-19 pandemic, with all the implications that this has meant. The feature of being online also extended to completing the survey.

5.4 Implications for further research

Further research should focus on quantifying perceptions to examine the effects of STREAM when students are back in the classroom as well as the implications of the approach on enhancing writing skills.

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APPENDICES

Appendix A – Participant Consent Form for students

Estimados estudiantes y padres de familia:

En los últimos días del mes de julio fueron invitados a completar un formulario como parte de un proceso de evaluación de la materia de STREAM, cuya información entregada se ha tratado de forma anónima y las respuestas de manera completamente confidenciales, usándose solo para este proceso de evaluación. Estamos muy agradecidos, puesto que la gran mayoría decidió responder afirmativamente a esta invitación.

Adjunto a este mensaje podrán encontrar una explicación sobre el objeto del estudio, la forma de participación y el compromiso del uso de la información que se provea, que seguramente beneficiará a todos los miembros de la comunidad educativa.

Nuevamente, muchas gracias por su colaboración.

CONSENTIMIENTO DEL PARTICIPANTE

Como parte de un estudio de satisfacción sobre las clases de STREAM en Quinto Año de Educación General Básica de esta unidad educativa, se extiende una invitación a formar parte del mismo.

Para ello, se les solicita a los participantes responder a diferentes preguntas sobre el tema, por medio de un cuestionario. Los resultados obtenidos serán utilizados en pro del mejoramiento del proceso de enseñanza en beneficio a la comunidad educativa.

La participación en este estudio es **voluntaria**. Usted es libre de no dar su consentimiento para participar en cualquier de las actividades solicitadas para este estudio. Ningún tipo de actividad académica se verá afectada si decide no dar su consentimiento. Todo tipo de información que provea a este estudio será tratado de forma anónima.

Si requiere más información, puede contactarse con José Luis Chapa Albán al siguiente correo electrónico **jchapa@espol.edu.ec**

Nombre del participante

Firma

Fecha

PARTICIPANT CONSENT FORM

I am conducting a satisfaction study about the STREAM classes to Fifth Grade students at this elementary school. For this reason, I invite you to take part in this study.

The participants are required to fill in a questionnaire about the research topic. The results obtained from your participation will allow a better implementation of the approach to benefit the school community.

Participation in this study is **voluntary**. You are free to withdraw your consent to participate in this study or any specific activities at any time. You understand that your academic status will not be affected if you decide not to participate in this study. The data you provide in this study will remain anonymous.

For further information, please contact José Luis Chapa Albán to the following e-mail account **jchapa@espol.edu.ec**.

Participant's name

Signature

Date

Appendix B – Participant Consent Form for teachers

PARTICIPANT CONSENT FORM

I am conducting a satisfaction study about the STREAM classes to Fifth Grade students at this elementary school. For this reason, I invite you to take part in this study.

The participants are required to be interviewed about the research topic. The results obtained from your participation will allow a better implementation of the approach to benefit the school community.

Participation in this study is **voluntary**. You are free to withdraw your consent to participate in this study or any specific activities at any time. You understand that your employment status will not be affected if you decide not to participate in this study. The data you provide in this study will remain anonymous.

For further information, please contact José Luis Chapa Albán to the following e-mail account **jchapa@espol.edu.ec**.

Participant's name **Signature** **Date**

Appendix C - STREAM Students' digital questionnaire

Learning English through STREAM

As a part of an evaluation of STREAM, you are invited to fill in the following form.

The information provided would be treated as anonymous using them exclusively for this evaluation process.

I study in Fifth Grade...

A

B

C

D

E

I am a...

boy

girl

I think my STREAM classes are...

fair

good

very good

excellent

In my opinion, the most interesting thing about STREAM is when...

we talk about nature

we check topics about history and geography

we solve math problems

there are activities that involve drawing and creating

we read and reflect on a text

I think the time assigned for my STREAM classes are...

insufficient

enough

exaggerated

The topics taught in my STREAM classes are...

interesting but complicated

not very interesting but easy

interesting and easy

not very interesting and complicated

I think that because of STREAM I am...

I am learning more English today.

I am learning less English today

I am learning English without any changes

For your previous response, explain why: _____

Compared to last year, I feel my STREAM classes are...

Easier

Harder

Similar

I think the resources provided by my school (technology and textbooks) are:

very good

good

fair

poor

If I had to change something about my STREAM classes, that would be:

Aprendiendo Inglés a través de STREAM

Como parte de un proceso de evaluación de la materia de STREAM, lo invitamos a completar el siguiente formulario.

La información entregada será anónima y las respuestas serán completamente confidenciales, usándose solo para este proceso de evaluación.

***Obligatorio**

Soy estudiante de Quinto ... *

- A
- B
- C
- D
- E

Soy ... *

- Niña
- Niño

Pienso que mis clases de STREAM son: *

- Regulares
- Buenas
- Muy Buenas
- Excelentes

En mi opinión, lo más interesante de STREAM es cuando: (puedes escoger una o varias opciones) *

- Hablamos de la naturaleza y las ciencias.
- Revisamos temas de historia y geografía.
- Resolvemos problemas y ejercicios matemáticos.
- Existen actividades que involucran dibujar y crear.
- Leemos un texto y reflexionamos sobre el mismo.

Siento que el tiempo usado para mis clases de STREAM son: *

- Insuficiente
- Suficiente
- Exagerado

Los temas tratados en mis clases de STREAM son: *

- Interesantes pero complicados
- No muy interesantes pero fáciles
- Interesantes y fáciles
- No muy interesantes y complicados

Pienso que gracias a STREAM: *

- Estoy aprendiendo más Inglés que antes
- Estoy aprendiendo menos Inglés que antes
- Estoy aprendiendo Inglés igual que antes

Explica el por qué de tu respuesta para la pregunta anterior. *

Tu respuesta

En relación al año anterior, pienso que mis clases de STREAM son: *

- Más fáciles
- Más difíciles
- Iguales

Los recursos que mi escuela entrega para mis clases (tecnología y libros) son: *

- Muy buenos
- Buenos
- Regulares
- Insuficientes

Si tuviera que cambiar algo de mis clases de STREAM, sería:

Tu respuesta

Enviar

Appendix D - STREAM Teachers' Questionnaire for Interviews

1. What do you think of when you hear the term “STREAM approach”?
2. How do you feel about teaching English through STREAM?
3. Do you feel supported by the institution as a STREAM teacher? Why or why not?
4. What changes have you seen in teaching English since applying STREAM in the institution?
5. What changes have you seen in students' learning since applying STREAM in the institution?
6. What do you expect from students coming from Fifth Grade/going to Fifth Grade?
7. Are there any techniques/strategies you apply when teaching subjects in English?
Explain
8. What can be done to improve the application of the STREAM approach?
9. What do you think about the resources given by the institution in relation to your teaching process?
10. What do you value the most about the STREAM approach? Is there a way traditional language learning has space in education today?

Appendix E – Students’ responses to digital questionnaire

Soy estudiante de Quinto ...	Soy ...	Plenso que mis clases de STREAM son:	En mi opinión, lo más interesante de STREAM es cuando: (puedes escoger una o varias opciones)	Siento que el tiempo usado para mis clases de STREAM son:	Los temas tratados en mis clases de STREAM son:	En relación al año anterior, pienso que mis clases de STREAM son:	Los recursos que mi escuela entrega para mis clases (tecnología y libros) son:	Plenso que gracias a STREAM:	Explica el por qué de tu respuesta para la pregunta anterior.	Si tuviera que cambiar algo de mis clases de STREAM, sería:
A	Niña	Excelentes	Hablamos de la naturaleza y las ciencias, Revisamos temas de historia y geografía.	Suficiente	Interesantes y fáciles	Más fáciles	Buenos	Estoy aprendiendo Inglés igual que antes	because activities are easy for me	be in face-to-face classes
A	Niña	Excelentes	Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más difíciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque antes el stream era mas facil y la mis nos dejaba hablar español.	las horas.
A	Niña	Excelentes	Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Más difíciles	Buenos	Estoy aprendiendo más Inglés que antes	Porque yo el anterior año no era tan buena en Inglés.	Más juegos, pero después todo está bien.
A	Niña	Excelentes	Hablamos de la naturaleza y las ciencias., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Iguales	Buenos	Estoy aprendiendo más Inglés que antes	Porque hay más vocabulario.	Nada
A	Niña	Excelentes	Revisamos temas de historia y geografía.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	estoy aprendiendo más porque el mister nos explica muy bien y lo puedo entender.	nada porque la clase es perfecta
A	Niña	Regulares	Existen actividades que involucran dibujar y crear.	Exagerado	No muy interesantes y complicados	Más difíciles	Regulares	Estoy aprendiendo menos Inglés que antes	Por que se me dificulta aprender Inglés	Que fuesen más interactivas y creativas
A	Niño	Muy Buenas	Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Yo estoy aprendiendo nuevos temas y mejorando la pronunciación.	Mas audios o videos que pueda seguir mejorando mi pronunciación.
A	Niño	Excelentes	Hablamos de la naturaleza y las ciencias., Existen actividades que involucran dibujar y crear.	Suficiente	No muy interesantes y complicados	Más difíciles	Muy buenos	Estoy aprendiendo Inglés igual que antes	por que me gustaria saber mas de ciencias naturales	mas clase de ciencias
A	Niño	Excelentes	Revisamos temas de historia y geografía., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más difíciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Practicamos más vocabulario, con datos muy interesantes.	no nada
A	Niño	Buenas	Resolvemos problemas y ejercicios matemáticos.	Suficiente	Interesantes pero complicados	Más difíciles	Buenos	Estoy aprendiendo más Inglés que antes	Porque cada vez aprendo palabras nuevas.	Que me hablen un poco más en español-
A	Niño	Excelentes	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Because I have known things that I have never seen in the previous year	that you put the rules of the Spanish class also put them
B	Niña	Excelentes	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguales	Buenos	Estoy aprendiendo más Inglés que antes	Porque nos han enseñado temas que no hemos visto el año pasado, solo que ahora es un poco más explicado.	Estoy conforme con las clases porque son muy interesantes y dinámicas.
B	Niña	Excelentes	Revisamos temas de historia y geografía., Resolvemos problemas y ejercicios matemáticos.	Suficiente	Interesantes pero complicados	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque le entiendo mejor al Mr. que el año pasado.	no cambiaria nada.
B	Niña	Excelentes	Revisamos temas de historia y geografía.	Suficiente	Interesantes pero complicados	Iguales	Buenos	Estoy aprendiendo más Inglés que antes	Porque mi profesor explica muy bien.	Que sea mas interactivo.
B	Niña	Muy Buenas	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes pero complicados	Iguales	Buenos	Estoy aprendiendo Inglés igual que antes	Pienso que estoy aprendiendo igual que antes.	Que traduzcan un poco.
B	Niña	Excelentes	Revisamos temas de historia y geografía., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque antes no sabia tan bien ingles ni siquiera sabia como se decia regalo pero poco a poco fui aprendiendo y asi seguire aprendiendo y e mejorando mi lectura gracias Mister.	Quiero cambiar que el mister vaya un poco más lento porque después de la lectura nos ponen problemas pero algunas veces el mister escribe es tan largo que no alcanzo a copiar luego que tomarte un scrim quiero cambiar eso en esta materia. STREAM.

Soy estudiante de Quinto ...	Soy ...	Pienso que mis clases de STREAM son:	En mi opinión, lo más interesante de STREAM es cuando: (puedes escoger una o varias opciones)	Siento que el tiempo usado para mis clases de STREAM son:	Los temas tratados en mis clases de STREAM son:	En relación al año anterior, pienso que mis clases de STREAM son:	Los recursos que me entrega para mis clases (tecnología y libros) son:	Pienso que gracias a STREAM:	Explica el por qué de tu respuesta para la pregunta anterior.	Si tuviera que cambiar algo de mis clases de STREAM, sería:
B	Niño	Muy Buenas	Hablamos de la naturaleza y las ciencias., Resolvemos problemas y ejercicios matemáticos.	Insuficiente	No muy interesantes pero fáciles	Iguales	Muy buenos	Estoy aprendiendo Inglés igual que antes	porque vemos algunos temas nuevos y otros temas que ya sabemos	Algunos temas nuevos
B	Niño	Excelentes	Hablamos de la naturaleza y las ciencias., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más difíciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque mi mister explica super bien y claro y si algo no entiendo el siempre me ayuda	Los días en los que recibo Stream
B	Niño	Muy Buenas	Hablamos de la naturaleza y las ciencias., Resolvemos problemas y ejercicios matemáticos.	Suficiente	Interesantes pero complicados	Más difíciles	Muy buenos	Estoy aprendiendo Inglés igual que antes	Todavía se me hace difícil, me cuesta mucho aprender otro idioma	Me gustan como son
B	Niño	Buenas	Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Iguales	Regulares	Estoy aprendiendo más Inglés que antes	porque antes casi no hablaba nada	menos imagenes
B	Niño	Excelentes	Resolvemos problemas y ejercicios matemáticos., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes pero complicados	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Because when I learn stream I learn more English than last year, with the new exercises.	more activities in kahoo
B	Niño	Muy Buenas	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes pero complicados	Más fáciles	Buenos	Estoy aprendiendo Inglés igual que antes	por que cuando interactuamos en clases es mas facil el aprendizaje	que tenagos mas horas presenciales de inglés
C	Niña	Muy Buenas	Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	porque me ponen mucho más inglés que el año pasado	más ejercicios de escribir o dibujar
C	Niña	Muy Buenas	Hablamos de la naturaleza y las ciencias., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes pero complicados	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque he mejorado y lo entiendo mejor.	Me gusta como están las clases ahora.
C	Niña	Muy Buenas	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque el profesor sabe explicar muy bien	nada
C	Niña	Excelentes	Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Yo siento que estoy aprendiendo más inglés por que lo entiendo más y hablo un poco más fluido.	Nada, mis clases están super bien.
C	Niña	Excelentes	Revisamos temas de historia y geografía., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más difíciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque ya que estoy en un grado más alto aprendo cosas nuevas y diferentes	nada, porque me gustan mis clases de STREAM así
C	Niña	Buenas	Hablamos de la naturaleza y las ciencias., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Más difíciles	Buenos	Estoy aprendiendo más Inglés que antes	Me enseñan más cosas	
C	Niño	Muy Buenas	Hablamos de la naturaleza y las ciencias.	Suficiente	Interesantes y fáciles	Más fáciles	Buenos	Estoy aprendiendo más Inglés que antes	porque ahora las actividades son sincronicas	ciencia, naturaleza ect
C	Niño	Muy Buenas	Revisamos temas de historia y geografía., Resolvemos problemas y ejercicios matemáticos., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguales	Muy buenos	Estoy aprendiendo más Inglés que antes	Estoy Aprendiendo Mas inglés Porque ahora entiendo lo que dice el profesor cuando está explicando en la clase	Kahoot
C	Niño	Muy Buenas	Revisamos temas de historia y geografía., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Por la metodología que emplea por mi Profesor	Nada
C	Niño	Buenas	Hablamos de la naturaleza y las ciencias., Resolvemos problemas y ejercicios matemáticos., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes pero complicados	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque en cada grado nos enseñan algo contable nuestra edad	que sean más divertidas
C	Niño	Muy Buenas	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque este año yo aprendo más temas interesantes.	Tener más actividades en la plataforma moodle
C	Niño	Muy Buenas	Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes pero complicados	Más fáciles	Buenos	Estoy aprendiendo Inglés igual que antes	Porque no se hacen todos los ejercicios del libro	

Soy estudiante de Quinto ...	Soy ...	Pienso que mis clases de STREAM son:	En mi opinión, lo más interesante de STREAM es cuando: (puedes escoger una o varias opciones)	Siento que el tiempo usado para mis clases de STREAM son:	Los temas tratados en mis clases de STREAM son:	En relación al año anterior, pienso que mis clases de STREAM son:	Los recursos que mi escuela entrega para mis clases (tecnología y libros) son:	Pienso que gracias a STREAM:	Explica el por qué de tu respuesta para la pregunta anterior.	Si tuviera que cambiar algo de mis clases de STREAM, sería:
D	Niña	Excelentes	Hablamos de la naturaleza y las ciencias., Revisamos temas de historia y geografía., Resolvimos problemas y ejercicios matemáticos., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguals	Buenos	Estoy aprendiendo Inglés igual que antes	en la materia de stream cada año aprendo cosas nuevas y enriquezco mi vocabulario.	desearía tener mas horas de clases.
D	Niña	Excelentes	Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Iguals	Muy buenos	Estoy aprendiendo más Inglés que antes	Por que lo contenidos que estoy viendo este año son nuevos , y con la ayuda del profesor he podido comprender mejor los temas de las clases.	Nada no quiero cambiar nada de mis STREAM
D	Niña	Regulares	Revisamos temas de historia y geografía.	Suficiente	Interesantes pero complicados	Más difíciles	Regulares	Estoy aprendiendo Inglés igual que antes	por fui muy sinsera	nada todo me gusta
D	Niña	Excelentes	Resolvimos problemas y ejercicios matemáticos., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes pero complicados	Más difíciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque cada que vemos una clase de Stream aprendo mucho más.	Nada.
D	Niña	Excelentes	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Por que las clases son muy interesante y aprendo mucho mas	No cambiaria nada
D	Niña	Buenas	Existen actividades que involucran dibujar y crear.	Suficiente	No muy interesantes y complicados	Más difíciles	Buenos	Estoy aprendiendo más Inglés que antes	porque cada semana es un tema nuevo y se cambia muy rápido de tema por eso se me complica un poco comprenderlo totalmente.	No cambiaria nada de muchos años atrás que desconozco y me cuesta comprender.
D	Niña	Muy Buenas	Hablamos de la naturaleza y las ciencias., Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes pero complicados	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque hay más vocabulario	nada
D	Niño	Excelentes	Resolvimos problemas y ejercicios matemáticos.	Suficiente	Interesantes y fáciles	Iguals	Buenos	Estoy aprendiendo más Inglés que antes	porque lo estoy aprendiendo	nada
D	Niño	Excelentes	Hablamos de la naturaleza y las ciencias., Revisamos temas de historia y geografía., Resolvimos problemas y ejercicios matemáticos., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque antes aprendiamos muchas cosas, pero este año estamos viendo más cosas como: geografías, problemas que han pasado hace tiempo, etc.	Nada
D	Niño	Excelentes	Hablamos de la naturaleza y las ciencias., Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque ahora todo es más organizado.	Nada
D	Niño	Muy Buenas	Hablamos de la naturaleza y las ciencias., Existen actividades que involucran dibujar y crear., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguals	Muy buenos	Estoy aprendiendo más Inglés que antes	Escogí esa respuesta porque cada día en Stream aprendo mas y mas de ingles	Nada, las clases de Stream me gustan así
D	Niño	Buenas	Resolvimos problemas y ejercicios matemáticos.	Suficiente	Interesantes pero complicados	Iguals	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque me gusta y cada día aprendo nuevas cosas que me sirven cuando viajo	ninguna
D	Niño	Excelentes	Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes y fáciles	Iguals	Muy buenos	Estoy aprendiendo más Inglés que antes	Estoy aprendiendo más inglés que antes por qué estoy conociendo más de Ecuador, EE.UU y de la moneda y muchas cosa mas.	No cambiaria por el momento nada porque si le entiendo al mister como explica la clase
D	Niño	Excelentes	Revisamos temas de historia y geografía., Leemos un texto y reflexionamos sobre el mismo.	Suficiente	Interesantes pero complicados	Más difíciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque aprendo mas vocabulario y puedo leer mejor	Poder participar mas en clases, para poder desarrollar mi speaking, ya que es mi debilidad en ingles desarrollar una conversación
D	Niño	Excelentes	Revisamos temas de historia y geografía.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más Inglés que antes	Porque y mas vocabulario y actividades con lecturas	Yo no quisiera que cambie nada.

Soy estudiante de Quinto ...	Soy ...	Pienso que mis clases de STREAM son:	En mi opinión, lo más interesante de STREAM es cuando: (puedes escoger una o varias opciones)	Siento que el tiempo usado para mis clases de STREAM son:	Los temas tratados en mis clases de STREAM son:	En relación al año anterior, pienso que mis clases de STREAM son:	Los recursos que mi escuela entrega para mis clases (tecnología y libros) son:	Pienso que gracias a STREAM:	Explica el por qué de tu respuesta para la pregunta anterior.	Si tuviera que cambiar algo de mis clases de STREAM, sería:
E	Niña	Excelentes	Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Más fáciles	Muy buenos	Estoy aprendiendo más inglés que antes	porque estoy sorprendida de lo que me enseñan , son muy interesant	que aprenderíamos mas de historia
E	Niña	Muy Buenas	Resolvemos problemas y ejercicios matemáticos., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes pero complicados	Más difíciles	Buenos	Estoy aprendiendo más inglés que antes	Porque están dando mas horas de clases.	Que sean mas fáciles.
E	Niño	Muy Buenas	Resolvemos problemas y ejercicios matemáticos., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Iguals	Muy buenos	Estoy aprendiendo más inglés que antes	Porque practico más inglés que antes.	Me gustaría que no cambie nada estoy bien con lo que tengo.
E	Niño	Muy Buenas	Hablamos de la naturaleza y las ciencias, Revisamos temas de historia y geografía., Existen actividades que involucran dibujar y crear.	Suficiente	Interesantes y fáciles	Iguals	Buenos	Estoy aprendiendo más inglés que antes	Porque en stream antes nos enseñaron algunas palabras y ahora muchas mas y además nos enseñaron nuevas cosas que antes no nos enseñaron.	Me parece que esta bien como es.
E	Niño	Muy Buenas	Hablamos de la naturaleza y las ciencias.	Suficiente	Interesantes pero complicados	Más difíciles	Muy buenos	Estoy aprendiendo más inglés que antes	La verdad no sé muy inglés, aún me cuesta pero sigo intentando avanzar	Nada
E	Niño	Muy Buenas	Resolvemos problemas y ejercicios matemáticos.	Suficiente	Interesantes pero complicados	Más fáciles	Muy buenos	Estoy aprendiendo más inglés que antes	Porque así se me dificultaba mucho que a veces ni entendía el idioma pero gracias a esta materia y los cursos que cada vez avanzo grado avanzo mi nivel de inglés y ahora entiendo bien	Nada para mí todo es perfecto
E	Niño	Regulares	Revisamos temas de historia y geografía.	Exagerado	No muy interesantes y complicados	Más difíciles	Buenos	Estoy aprendiendo más inglés que antes	Porque los temas son diferentes y hay nuevo vocabulario.	No escribir tanto y que sean más interactivas con quizzes y juegos

Appendix F – Interview Transcripts

Interviewer: Author (Speaker1)

Interviewee: English Teacher – Fourth Grade (Speaker2)

Date and Time: Friday, July 23, 2021, 12h30

Speaker1: [00:00:00] Well, as you well know I'm working on my master's thesis, and I would like to talk to different teachers at the institution about the topic I'm studying to see what information we can get now. Let's see, the topic I'm studying is learning English through STREAM and how it influences, that, language learning.

Speaker2: [00:00:28] That is, in the cross curriculum.

Speaker1: [00:00:31] Aha. Then I'm going to ask you and you're going to answer me. The first question is, let's see, when you hear the word... when you hear STREAM or as an acronym, the acronym not the word STREAM. What... what do you think? What comes to mind?

Speaker2: [00:00:55] Precisely what I told you, cross curriculum... that is, that it is not only to teach English as a subject: grammar, reading, vocabulary, but to connect it with other subjects. That's why, at least in the institution, we had Science, Technology, Engineering, Art, plus Reading. In other words, all in one. That's why I say cross curriculum, which connects subjects with the language to learn the most enjoyable way, not so, so strict.

Speaker1: [00:01:33] And you were in the pre-STREAM stage at the institution, before implementing this, did you have knowledge of this approach... of this way of teaching?

Speaker2: [00:01:45] Actually, no. This came to happen already when we started to see a little when it was Sistema Uno, that there we began to connect subjects and more. We didn't know it could be called STREAM. Yes, because in the beginning, 20 years ago... when I started it was Language Arts, Reading, Oral Skills and, and Spelling and there was a part called Science as a very separate subject to take into account. But now, after the years passed and so on, with the addition of Sistema Uno, we began to, to put everything together, to cross all the information. That's why it's called the cross curriculum.

Speaker1: [00:02:35] Well, now, in your experience as a fourth-grade teacher, how... How do you feel about teaching English through STREAM?

Speaker2: [00:02:45] It becomes much more enjoyable because you can give it a reading about, for example, animals, habitat, and what predators they have. And, by the way, it's using have/has... grammatical structures and vocabulary on the subject. Then it is already much more enjoyable for the students, who don't really realize as much that they are learning vocabulary and grammar and are being immersed in all that, in all those subjects, from a science topic, topics that come together.

Speaker1: [00:03:29] So, can you say that you liked that way of teaching?

Speaker2: [00:04:18] Definitely yes, because taking into account, for example, when we had Science as a separate subject, there were distinct grammatical structures. There were different things, different vocabulary to teach. Then we did not go hand in hand with the vocabulary that was taught in English... in English as a Second Language per se. But now, combining subjects... makes everything easier for the student. For us as teachers too.

Speaker1: [00:04:05] Do you think that students feel part of this way of working?

Speaker2: [00:04:55] Of course, because they're even topics that you start to like, as I mentioned the issue of animals, which was the project we did last year. Well, they looked for their favorite animal, what information to look for and everyone was passionate about it because it's something they like. I'm not giving you a theme, let's say present progressive, no: about... a favorite animal, in a subject that they really like and are interested in... that they can develop other things.

Speaker1: [00:04:41] Now let's talk a little bit about the institution and STREAM. Do you think that the institution has given or supported you throughout this new approach to teaching?

Speaker2: [00:05:44] We, as an institution, know that we have a book with a work program and, as they say, that the teacher does what he can do most, because there is material that is not inside the book... it is either very old or does not connect with our reality. Then there are things that we have to connect to our reality, certain situations. If we are talking in Social Studies about the elections in the United States, include something about the recent elections in our country were, now that we have a new president. That is, there are things that we have to include, because if not, it is not clear, totally clear. The institution tells us: come and you see. That depends a lot on the teacher, the desire he has to teach and how he can go little by little directing his students so that everything goes well.

Speaker1: [00:06:01] Do you think the institution didn't support you or hasn't supported you in, in, in, in properly preparing you for that task of teaching, in that way? Or do you think that the institution should not get involved in that? Because as you say, it already depends on how the... the teacher does it in the classroom.

Speaker2: [00:06:23] Right, we've had seminars, yes. When we started with the new book, we had seminars and how to use it and everything. But there comes a time when one also with the experience, one is putting his touch. That's when planning isn't a straitjacket, but it tells you to teach this, but it's up to you as well. The institution has given certain training, certain things, but I do think there are little things that can be improved. In videos, in materials we need, in... I don't know... now that we are still online and in a certain way that in a hybrid way. If at certain times, there are situations that can be improved with certain activities. But hey, let's hope for that over time.

Speaker1: [00:07:08] Do you know other cases in which this strategy can also be applied, and this way of working? Let's see, some examples that you know of any program that is being implemented or not.

Speaker2: [00:07:23] Well, talking about that... they're just teaching Spanish in the United States through subjects. That is to say, they are applying STREAM precisely to teach, to teach Spanish. They, through subjects, have to teach natural sciences, mathematics, social studies about the country where the teacher is from. This company hires people from other countries. So, if I go there, from Ecuador, I have to teach my culture, I teach about animals from me, from my country, the climatic regions of my country, that is to say everything, but in Spanish, in my language. And there goes again the cross-curriculum is being applied in many parts of the world. If everyone, each institution in its own way.

Speaker1: [00:08:12] But if, now let's talk to the teacher, in the classroom, how or what changes have been seen in your way of teaching English, by applying this strategy?

Speaker2: [00:08:26] Changes, mostly in the technological level, because obviously... previously we only had, we had video players, a television... 20 years ago and it was, asking sometimes it took time to deliver the video, we had to edit it ourselves, sometimes we didn't know how. But now... there are videos on YouTube... online games. There are more activities that can be done. The institution has a Moodle platform to create activities for students to work. So, it's a matter of adapting to that technology to get the

student ahead, because students are very visual. If they don't see it, if they don't have colors in front of it, a song, or some way you can abstract the knowledge more, more to your liking. No, we are not making progress. Many, that, if you do not show something that really has them interested in watching, they will not follow, they will not follow you during the class.

Speaker1: [00:09:30] Well, since you mentioned students. Also, throughout these years you have been working with STREAM, what changes have you seen in students... on how they are learning?

Speaker2: [00:09:41] Many of them even remember more certain topics... for example, what we had again the project last year: favorite animals... they remember that topic much more today. I've seen cases of guys who have been a year or two later and still remember what they said in their song, because it was something that was so immense, so recorded to their liking that they don't forget it. So, the idea is also that, teaching is that, not teaching for that moment, for that exhibition, project, but for life, so that at some point it will serve them later as an adult or in the near future, to then move on and keep learning.

Speaker1: [00:10:30] Let's see, now as a fourth-grade teacher... wait a minute... what is expected of fourth graders when they come out of fourth grade and go to fifth? What could they expect to gain or acquire in knowledge to be prepared for fifth grade?

Speaker2: [00:10:59] Let them acquire more than anything in knowledge. (The ability to) be able to perform orally, much more confidently, that they can have a basic knowledge of grammar to be able to communicate and to write. That it is not only grammar and writing, but also certain general topics... general knowledge, mathematics, social that have a basis, a solid basis so that they continue to rise. Let's remember that all these books that we have and any book that in any institution usually handles the same subject, only a little extra, a... one more theme, one... one more difficulty, one more level of difficulty... at the same time, each time you go up in difficulty, every year, topics are recycled so that the students do not forget, and they always, always remember.

Speaker1: [00:11:54] Now let's talk about strategies. I don't know if there would be any strategy or a technique that you believed that it worked when you were trying to teach English.

Speaker2: [00:12:07] Mostly handmade activities, group activities. For example, if we were already teaching... at some point we made a paper boat last year... well two

years ago when we started STREAM. I said, well, but the paper boat is going to sink. I want you to come up with ideas so that the car... the boat does not sink. Then some of them put cardboard and that did not work out... ice cream sticks. Then it led them to go further, to not only stay in that they have done something with my hand. And we also talked about the wind, how the boat moves by the wind and why it floats in the water. That is, several properties at once... of sciences, how to make that paper not get so wet and that it stays floating longer... with ice cream sticks, with some other kind of material... so on. So that's group work. Those exercises remain in them, in the mind. They remain totally, because it is at the same time that they have done it with their hands. It is tangible and the knowledge is much more reinforced in them.

Speaker1: [00:13:24] So, do you think art also influenced the way we teach a lot?

Speaker2: [00:14:16] Definitely yes, because there are a lot of guys who say, "but Miss, are we going to draw?", "but Miss, are we going to paint?" And then, not only leave it in, in that there we are going to make this plant grow, the subject of science, we are going to grow a little bean and everything. No, but also that they draw it in their own way, what they put, how it was growing, how the process went... what is known later as the scientific method, of seeing the whole process of change of a plant or change of a little animal. That gives them the basis for later. All that gives bases for later to that art: painting, drawing... (that) I always say to my students: "I do not want Picassos, I want you to do it your way, but to do it as best as possible and that it stays as you believe it should do, as you who feel that I must do and do it".

Speaker1: [00:14:25] All right. Now let's talk about improvement. In your experience, how do you think you should improve STREAM learning in, to... to be able to learn English? Or do you think it's okay or... what is missing to improve?

Speaker2: [00:14:45] We need to improve more than anything in support material. We.... There are many things to investigate, which obviously the professor never finishes investigating. But there are things that are not entirely clear. It's time to do more research in terms of technology, material and in class. We have to do some videos or flashcards or things like that. That is, to be able to have more, more resources. Some, some internet page where we can get exercises, that, if there are PowerPoint presentations, things like that to also help each other to move forward with the program in a better way. It has been done well so far, but it can be helped more effectively in what is technology and support material.

Speaker1: [00:15:38] Well, this is like your answers always take me to the next question. The next question is about resources. What do you think of the resources they have... the institution has in relation to your teaching process?

Speaker2: [00:15:51] We've had to stick to everything: before, as I say, we had a... one, an overhead projector and an old television, and a VHS... and the recorder. Nothing else. So, it was a matter of technology changing and all that technology came to the institution with the computer, the internet and so on. How to improve? Perhaps the projectors, which are sometimes very dark in light, some equipment can be renewed... to update computers. Also, that we can have internet access in the classrooms. If there are little things that can be improved... internet, the classrooms, but that the kids are obviously monitored or that they have control so that they do not, do not go to pages not, not appropriate for them, but that they can do a process of investigation themselves or in a group quietly, so that it is not only the teacher, but also an investigative part of them. In the United States, currently, every student in... in a classroom, everyone has their own Chromebook. So, inside the classroom each one assembles groups and can each other investigate and work various things inside the classroom with their computer.

Speaker1: [00:17:18] Do you think students are learning more... do they learn more now that we are teaching in this way or learned more the way we taught before?

Speaker2: [00:17:29] You're learning more now. Now... it's definitely now because they connect with more information. When at some point I taught, for example, I found among my things, a video about whales, orcas and everything that was the SeaWorld in Miami... right? in Orlando. So, what happens? There are kids... there are kids who already travel, who already know and take a liking to them, but if they have... other than that, you jump into a matter about marine animals and what mammals are. I mean, you're going to something else. Now kids are looking for more information because they have it so easy on the internet that if you don't know it as a teacher, you're left (behind). They're learning more and they're acquiring a lot of knowledge, a lot more information now.

Speaker1: [00:18:24] And well, the last two questions go with each other. What do you value most about the STREAM focus to learn from it?... and if there is, and if you do not think that there is any space that can have the traditional way of learning languages or how we learned it, in today's education.

Speaker2: [00:18:53] Old education was very repetitive. Repeat these vocabulary words ten times. Repeat this, repeat the thing here... it was too much and... and sometimes

they were the same exercises that he had, as he says, or they didn't memorize them. There's the answer, it was here, there, already. A great deal is being asked for now. Today we want the student to think for himself... that, if you already have knowledge, that you know how to organize your ideas and be able to produce, whether in writing or orally, if we do not give those tools to them. impossible. They leave... van to continue to become machines. At some point, as a young woman, I felt when I was studying that we were machines because we repeated... they were notebooks and notebooks of repetition and help with the vocabulary. Nobody says no, but now there are better ways for the student to have and connect the vocabulary with an image, with their writing. From a young age, from a very young age, if you show a 3-year-old a can of tuna and tell him that's tuna. He's going to recognize, even if he doesn't know how to write it, he's still going to recognize that's what the teacher or his mom or a family member taught them what it was. They are very visual and... go back to ancient times... like that... mmm. Today's generations are asking us for more. They ask us much more than that.

Speaker1: [00:20:28] But here's what I was telling you about what you value most about the STREAM approach.

Speaker2: [00:20:35] What I value the most...

Speaker1: [00:20:36] what do you like more about it?

Speaker2: [00:20:39] That, crossing the curriculum, having more topics to hold on to. Sometimes we had to... for Reading: Now, what are we going to do? And what kind of reading can we use? And for their age you have to see if they will be ok, too. No, we now know that we can talk about a voting issue, about how it was before the present, how it is now and how we want it to be for the future. In other words, we cover a lot more of a subject. That's what I value most, crossing contents not only of grammar, but with everything.

Speaker1: [00:21:20] Well... Basically, that's it, exactly.

Interviewer: Author (Speaker1)

Interviewee: English Coordinator – Second to Fifth Grade (Speaker2)

Date and Time: Friday, July 23, 2021, 13h15

Speaker1: [00:00:00] Now. Well, then. Let's start with the first question. When you heard the acronym STREAM, what did you think about? what did you imagine?

Speaker2: [00:00:20] When thinking about the acronym STREAM I thought first of STEAM because it was previously STEAM before STREAM. Then at one point I did not know what they were referring to, until they explained to me what the matter was about.

Speaker1: [00:00:38] OK, so you didn't know it before either.

Speaker2: [00:00:44] I didn't know it, of course. Previously until some people came to the institution to show us that new and interesting service to the educational community with the term STEAM.

Speaker1: [00:01:00] That was just something I was going to ask. When explained what STREAM was and then compared it to STEAM, what did you see as equal or different?

Speaker2: [00:01:09] Well, only that the word Reading was added, because everything was equal to some transformed into new spaces where the English language was taught in a more general and global context and not by separate subjects.

Speaker1: [00:01:27] You have experience as a teacher and now as a coordinator, let's talk about this stream approach applied at the institution. How do you see it or how or how, or how do you analyze it?

Speaker2: [00:01:40] Okay. As I said to my great team. We can get many new stages of learning, teaching the English language, we can get many books, but it is the teacher who really transforms students' life. With Stream we're currently working and, if we've noticed, well, I've noticed that there's been a pretty resounding and different change, where not only memorization is applied, which would already put this in the background, but rather the internalization of our students' knowledge in each of the subjects that we have here to teach them.

Speaker1: [00:02:27] Well, now obviously, no intention of offending anyone, because obviously here we are, we are investigating, and the truth has to be told. In your experience, as a teacher and considering these changes from traditional to teaching with

STREAM. Do you think the institution really supported us in that change or in that transition? Or you're one of those who say: good, we got this, with or without that support.

Speaker2: [00:02:59] When the institution really got the start for us to start working effectively with the STREAM methodology. But it's always up to the teacher. As a teacher, I don't just stay with what the institution gives me, but I also have that research spirit. For what? To induce myself in a better way as a teacher, to look for new methods and techniques that are accompanied by the system in which we are working.

Speaker1: [00:03:29] Well, now we could say that it's almost ten years since we've implemented this way of teaching English through subjects. What changes have you seen in, in us, teachers or in or in the way English is taught?

Speaker2: [00:03:47] Pedagogical strategies change every day. The learning of English by our students is reflected when they are promoted to the next... sorry to the next grade. You see that there is learning, you see that there is internalization. Obviously not in 100% of students, because each of them learns differently and at different speeds. However, significant learning is happening and, working together to achieve the goals is why we are always looking for new ways to implement this modality of STREAM in our institution.

Speaker1: [00:04:28] Now let's go back to your experience as a teacher and in implementing STREAM in the classroom. How... How... how did they feel in the first few weeks? How did you feel that the students were reacting to the new approach? How did you implement it?

Speaker2: [00:04:46] Well, for me it was really something new. I had my doubts at first, yes. Obviously... changing the teacher's chip is more difficult than changing a child's chip. So, what did I do as a teacher? I followed the guidelines of the book, but seeing the needs of my group, no, the book can give me ten thousand and one examples of how to take a class. But sometimes not even that. None of that is useful in our classrooms. Then the work of the teacher is also implemented, it also implements that knowledge and experience that one gets to have with the different groups that one has. It led me, for example, to look for new teaching methods, because if English was more advanced, with so much vocabulary for children. At that time, I was working with second and third basic. The readings, because they were not only heard or read, but rather acted on, both first by the teacher and then by the students.

Speaker1: [00:05:49] Well, now it's time for your job as a coordinator and we know that your work ranges from second to fifth grade. But after fifth. Ehm. I don't know, is there any follow-up or analysis that is done of how the kids go from fifth to sixth? As for the advancement of English. How much, how much in your involvement of that part or really there isn't? No, is there no follow-up or what happens there? In the transition from fifth to sixth.

Speaker2: [00:06:24] As we already know here, there are different coordinators in English. My work from second to fifth is good and as we know the work and learning of students in a spiral way and there is always contact, there is always communication and there are always questions and inquiries from one coordination to another. In case, in the case of the one that was the coordinator for sixth and seventh grades, because we always shared the needs of each group, how far they reached, how far they reached. What do you need to remember? What needs to be strengthened in our institution? Yes, yes, and if that arises, good communication and empathy, especially to achieve the objectives that the institution manages from second to third year of high school.

Speaker1: [00:07:17] And now let's talk a little bit about improvement, because obviously we always have to be changing and improving. What. Once it's been so long, uh, applying this method of STREAM in the classroom. What do you think should be improved on or what do you think should change regardless of the text or of us teachers? What needs to be improved in this matter?

Speaker2: [00:07:45] Well, I think so, the student should be the protagonist of their own learning, also obviously depending on the level at which we are teaching. But always, eh, I believe that we are already going to go a step further to let the student come with their previous knowledge, inquire about their knowledge, know what they know about so that they can also provide the other partners with their knowledge. Learning from each other is quite important nowadays. It is happening that the teacher has given students enough space to let them express what they know, to let the student share their knowledge with others. And if I agree that we should improve that, send the student to do research, motivate the student to read, research, and come to school with their... own... knowledge.

Speaker1: [00:08:38] Well, in your opinion now, combining a little bit of your experience as a teacher and your activity as a coordinator. What do you think? What do you think are those strategies or those techniques that can be effective in teaching English through subjects? Well, what can we highlight there in this approach of teaching with

subjects? What can we apply or what can we work there to exploit what we want from students?

Speaker2: [00:09:10] Well, we currently live in a globalized world with divergent changes. Totally dizzying changes, that would be the word, right? The student learns more easily because the student has access to knowledge thanks to new technologies. I believe and I don't believe. I am more than sure that the student should never be alone. Students always have to be accompanied, they will always need the support of the teacher and it is always necessary to be observing them and aware of what they are seeing and how they are learning it already.

Speaker1: [00:09:52] Now. While it is true that we always end up focusing on the grade, on the score. Let's talk a little bit about knowledge. Do you think kids are learning more English now than they were before this way of teaching was implemented?

Speaker2: [00:10:13] Well, speaking about assessment, we do it every day in the questions we ask the kids. In our classes. I realize that every day that my fellow teachers offer a class offers a new topic, because they are investigating and at the same time they are evaluating, and we are evaluating, and we realize if the child understood. And that's what matters, I think before it was memorized in my time... I was sent to memorize. It was 50 verbs a day... I learned them, but what happened next? I forgot most of them, but I remembered two and 3... and didn't know how to use them in context. That is the difference. Quality or quantity. We are learning little by little and the results we see when the boys leave our institution with a B2 level, even with a level according to an advanced level of English. That is, yes, what we are doing... it works, and it is a better way to teach the English language and to our students.

Speaker1: [00:11:11] And since you mentioned some of traditional education, is there something from traditional education that we can use today or that's really outdated? Is there nothing left to do with that... with that way of teaching we used before?

Speaker2: [00:11:29] Although some people think that the change has to be 180 degrees, I think there is something we can use from the traditional method. Memorization cannot be left behind. Memorization is very necessary, but no longer to fully learn the discipline that way, above all. It is also necessary to connect with the student, but always setting the limits, right? That if it is more important now the motivation before was fear. That must stop. That must be abolished. Motivation, above all, must be paramount in our language teaching.

Speaker1: [00:12:05] And well, the last question, Mr. huh? What do you value most about Stream approach? Or what's the most important thing you appreciate from that approach?

Speaker2: [00:12:19] The student's interest in a certain subject or in a certain, certain, certain topic, a certain topic in question. Now children can see that, for me, because I have witnessed history, when they talk about elections from previous years, that the woman could not be given that right to vote. But I see that now the teachers make them interested in what for me as a child was boring: politics, but for them. I see they are interested. So, if you are handling in a good way the way the language is taught, showing it in a way that calls and captures the interest of the student. Because obviously in a class if there's no interest, there's no attention. If there is no attention, there is no understanding. If there is no understanding, there is no interest. And I think the Stream system is working well precisely because of the teacher's work. And it is the teacher's work that does it and not the book.

Speaker1: [00:13:22] OK, Mr. I thank you very much, eh, for your time, because you have many things to do, and I appreciate your time to talk to me. I, I'm going to use this information for my work as I said.

Interviewer: Author (Speaker1)

Interviewee: English Teacher - Sixth Grade (Speaker2)

Date and Time: Friday, July 23, 2021, 14h00

Speaker1: [00:00:00] Let's go with the first thing. You have to teach STREAM, so when you heard about it, when you were told that the day you arrived at school. What did you think? What did you know or feel? Or did you not know anything?

Speaker2: [00:00:15] Well, it's like it's almost, the same as, not almost the same, but if it's like CLIL's approach, which is to teach the language through content. I, to tell the truth, for the kids, who I teach, that is the age that they are, I do not think it is the best for them. Then when I was told that... that we had STREAM, I said, well, I was going to suffer a little bit, but it's because I don't agree with that, because I teach them content to the kids, that is, in English, in through social science content and those that we teach. I felt I was out of place.

Speaker1: [00:01:14] And, did you already have CLIL experience somewhere else? or not?

Speaker2: [00:01:20] Yes, yes, because in the school that I used to work there were also English books, that is, science books in English, which is not that there was, for example, it was not for learners, but a book that was... that they used back in America... I was a fourth-grade teacher at the time, with stories about dinosaurs and the science stuff, but as content not, as an English language learning program.

Speaker1: [00:02:04] Now, as for your years of experience teaching STREAM, how do you feel teaching or applying this methodology?

Speaker2: [00:02:19] I think that, over time, eh... I mean, at first it cost me because as, as, as I said, I don't like that. Because, for example, students in this... it is not their native language. They would like to understand every word he says in the reading. For example, I'm giving a definition of what metals are. The definition is shown, and they want to understand every word and, no. So... And... And obviously we can't explain every word. Just give them... the generalizations. So that's why I felt a little frustrated because I didn't feel like I wasn't getting to them. Because they wanted... I felt that they had the need to understand the word. But over time, I, eh... how many years... four years or so, I've already learned a little how to handle those kids don't feel powerless either... just like me, frustrated, for not understanding every little thing about reading or every little thing related to science or every little thing of concepts. I have already learned a little bit how to handle

it so that they can understand, understand and that they are not afraid of, of, of the subject. Well, but little by little I have learnt how to handle them, taking very important things. Or maybe focusing on, in, in sentences, it is quite important... that is... in a sentence, that they can understand or understand it. That's what I've learned.

Speaker1: [00:04:02] Now, that change in attitude towards STREAM and what you already know and apply, has it been influenced by the school that has supported you or do you feel that it has been a product of your own work and has the school done little or nothing in your preparation for these types of teaching approaches?

Speaker2: [00:04:30] Unfortunately, that's been thanks to intrinsic motivation. That's been mine, but because I've been so frustrated when, uh, at first, when I was teaching and I felt like I wasn't coming, I felt like I wasn't, the kids weren't even understanding. When they wondered which was the most difficult subject for them was always STREAM, because it had too many concepts, a lot of information. So, that's when I felt bad because I felt like I wasn't giving my best, but then I, I, I, I motivated myself to learn what it's like to give the classes, see trial and error. And I would give the classes, but I realized "no, this I did wrong, and then I tried to correct it in the next class. As for the institution, help me or train me, they tried, but I think they did not fulfill their goal, we had trainers who supposedly teach us how to teach STREAM, but I, at least, I have asked and they did not fulfill their goal that we or that I feel, eh, comfortable to give this class, I am not afraid... No, that's not it, they didn't comply. The goal was achieved by me.

Speaker1: [00:05:53] Now, a little bit about your way of teaching and how, how, how STREAM... has changed or not your way of working.

Speaker2: [00:06:02] Well, I think that here these things that we don't like makes us like, more; they help us to have more knowledge in something good, because as we have to do it and even if we don't like it, then we have to instruct ourselves by other means, right? So, anyway, this makes us better teachers, because we try that even if we do not like that, they tell us what to do, and we do it so that the students go well, eh, thinking about, do this for the students, then. I think, uh, teaching STREAM has benefited me in the sense that uh, uh, I've acquired new methodologies so I can get to kids. And, above all, in terms of how we are in this pandemic, take these new applications, new resources that also help you teach content. So, in my classes what I do is I try to do STREAM, try to make it reality-based, right? Things that kids can take, things that kids can experience or live. Make learning with STREAM more meaningful.

Speaker1: [00:07:30] And that's where my other question is going, huh? Well, what you've mentioned is what you've learned. How do you think kids have been influenced to learn English through this approach?

Speaker2: [00:07:41] For example, we were just seeing something about Mahatma Gandhi. Then, the kids and I had seen something about Nelson Mandela. How did they connect that? Uh... general knowledge of... of the important things that happen in life. So, they related what Gandhi did is very similar to what Nelson Mandela did, for example, because it was already a topic that we had reviewed, it was a reading that we had not checked with them. And that makes them anyway know general culture, knowledge in general knowledge, right? Also, in the... in science they can acquire new information. That is, from your environment and apply it to what it is in your daily life. So, I think the students... now I feel that they like it a little bit... I think that the kids, in terms of participation in class, for example, I see, I see, I see, maybe it's also neither me nor my desire for the kids to be attentive. So, if I see that it's also reciprocal that desire to want to know a little more about the subject.

Speaker1: [00:09:14] And now, you and I are from the generation that learned English differently. Unfortunately, we learned in one way and teach in another. How? How do you see that difference? Do you think how much, how much more or how much less do you think they are learning in relation to how we learned?

Speaker2: [00:09:39] I love that question, because I always ask myself and always analyze it. For example, I said, "repetition is wrong". I remember they made us repeat the verbs, write many lines, repeat, repeat, and repeat verbs. But that made me write the verbs well anyway. Kids, for example, they can't, they pronounce it, they know it. But some cannot write, you start because they do not repeat it, because it is not something they see daily. Before it was by means of repetition. However, speaking English was super difficult before, because instead there was everything written and everything in structure. But there were very few who spoke in English. On the other hand, at the time I see students who speak the language. Maybe not in terms of structure, but they talk to you. And, for example, I have students who speak the language very well, but he is asked to write a sentence where they use the comparative, a comparative adjective, they do not know how to do it, but we speak about it and it is clearer, I think that many things can be done to improve language learning. In the end, learning needs to be designed in terms of generation, to, to, to evolution, because being left behind... impossible, right? Now the

classes have to be much more dynamic, more active. Kids demand more. In the past, there was one who misbehaved, the other 20 were well behaved. Now I think there are two who behave well, and the rest are always active. So, if I stay in that not everyone is like that, impossible. Everyone should have much more didactic and active classes. But there should be a bit of both

Speaker1: [00:11:37] Being in sixth grade now: what do you expect from a fifth grader when he/she goes to sixth grade in relation to STREAM?

Speaker2: [00:11:47] I think the main thing, I would say, because it's STREAM, it is that the kids know how to identify main ideas. Main ideas eh, eh, and supporting details. I think that they still struggle with it. But then they read it. What is the main idea you got from the text? No, they do not say anything, but if you ask for the year something happened. They know where to look for. As for analysis, because well, maybe they are young, but if you take the main idea of the text so that it makes it much easier for them to understand the paragraph. As for STREAM, I think that's the main thing, because there's a lot of content and a lot of reading. The idea is that they know how to extract the main idea and the supporting details. I think that's the most that I would expect from STREAM.

Speaker1: [00:13:01] And, for example, as for the classroom, the preparation that they have if a week has already passed, the first week of class and you intend to evaluate what, what they, what they have worked or responded in relation to what you expect, is it much? or do they lack anything? Or do you think it is normal what they know or what they do not know how, what do you think?

Speaker2: [00:13:35] I think they are within, within what I expect in terms of STREAM, they are within what I expect. It will be that I think it would be a perfect complement the fact that they know how to get main ideas. I do not think they are lost. They have that prior knowledge. Even if I've heard of some students saying "oh, yes, last year we saw that", but anyway I think that those three months that the kids are on vacation it is like they erase almost everything learned and that's when I can't judge, to say a word, how the class of the previous year was handled, because it's happened to me that the kids don't remember, it's like they start over, they start over. At first, it is as if they do not know anything, they do not understand anything, but when time passes, the first partial, there you see, there you see what the children have really learned, because it is like little by little they are remembering and adapt again to this rhythm of study: learning, teaching, learning, they adapt again. It's like they're really showing what they know. For example, it

has happened to me only now that they say "yes, we studied that last year", that is only now, and it is a subject that I saw from the first partial and only now they remember that they studied it last year, but they never told me, never it, they never mentioned it. It is as if all information was erased, that is why I see that I consider that to be an influence as well.

Speaker1: [00:15:40] And how can this way of working virtually affect that kind of learning?

Speaker2: [00:15:51] Yes, I think it affects a little bit, because, for example, there is content that should be a little bit, for example, especially in science, it should be where they can manipulate. I have a glass full of vinegar and I want to add baking soda and that it explodes, if we are careful of any equipment and as for the stories, it is cool, for example, explain, to tell a story or organize role-plays: you'll be Christopher Columbus, you'll be... But here it's like they read, they're already reading it, you explain a little bit more, so a little bit more in mimicry, but it's never going to be the same. That's why I say that the STREAM I have to work must be meaningful, I have to work so they can remember. STREAM should be something super significant. Now, virtual? Yes, I think it would be much better if it was all face-to-face.

Speaker1: [00:17:29] And what do you think kids value most about STREAM? I don't know... science, they are more interested in reading, math problems, or maybe art. What do you think that they like more?

Speaker2: [00:17:49] Science. They're used because now kids like to do things. Well, not always them, they themselves are the ones who are most surprised... make slime, now that everybody knows but them doing it, it is different. For example, we have in science chemical changes, physical changes and if they have to mix flour to bake a cake. So, learning is the, to discover that those little things that they have around and for them it is incredible. That's why I think what they like most is Science. Now history too... we call Global Citizenship... because they also understand a little bit more of why they are here or what is going on, or the story of, for example, when talking about Christopher Columbus, they had their own analysis of determining whether Columbus was bad or not, based on the accounts offered by the text. Then, I do not think they like Math...

Speaker1: [00:19:25] And now about engineering... what would be the role of engineering in our classes?

Speaker2: [00:19:30] I do not even know what engineering means, but... I assume that there are certain things that they have to create, like those projects that the

school displays. That's what you mean by engineering. However, I believe that when we, we are in classes, applying this... it seems to me, I think it is very difficult... there's something about rocket ships, for example. I think they still have an age where you have to do things that go with you. I mean, they have the creativity, yes, but they still have to go with you so they can create something, something not new, but applicable... I do not think we are using it at all.

Speaker1: [00:20:33] Eh... And now let's talk a little bit about strategies. What are the strategies or techniques that you use in class? What do you feel about strategies that work very well? Something in particular... I liked this... I will use it again.

Speaker2: [00:20:55] In STREAM I always try, for example, in science, to show them the object first, they analyze it and from there I can get the concept of that example that I'm showing, if I'm talking about metals, I hope I can provide examples of what are metals and nonmetals... and that they, when manipulating it, analyze why it is hard, what color it is. That is, they themselves analyze and then we can get the concept, and then read and complete the activities that they must do. It also happens with Global Citizenship, ask... prior knowledge to see... who you believe, what... and with all the information get the concept, to see what they got right or wrong... And for think tank (math)... we talked about what kinds of soda they like and why before introducing the topic of competition... I think that's what works best for me.

Speaker1: [00:23:00] What can be done to improve the focus on English?

Speaker2: [00:23:10] Do not apply STREAM... it's a joke... it's a joke

Speaker1: [00:23:14] Well, that's possible... you can contribute with another idea or approach... what can we do to improve STREAM?

Speaker2: [00:23:25] I think it's a lot of content, a lot of information for kids in, in a school year... it's too much content and it's very...we are not taking learning as a whole... In the past we worked through repetition... We learned, in the end. Today, we check one topic today, but we are checking something different for the next one. And they do not remember... With young learners, you should repeat, reinforce... and it feels so different when we are checking a new topic. We should reduce the content, focus on a single topic that goes throughout the school year so that the boy practices the same topic, the same topic and they can learn.

Speaker1: [00:24:55] And do you think that the resources that the institution gives us will help us in that teaching process or do not contribute? Like the books...

Speaker2: [00:25:08] I really don't like it, no. I don't like it, I don't like it. I think kids at that age should have materials focused on the basics of the language, the fact that they know what the past is, how the present is... that is something they need to identify... a program with a book that is, which focuses on what is the structure. View content? I can't say no, but reduced, a content that is very small and according to their age. In high school, maybe in eighth grade, in ninth grade, it could be possible to learn through subjects, and implement STREAM, that they already know what a sentence is, they already know what they are past, it is something that they have presented, they already know what verbs are and they have it fully identified and there they can understand, understand the, the material itself in the language. At that age, they should study more language structures, the basis of it.

Speaker1: [00:26:37] We've already talked about STREAM for half an hour. But surely there has to be something that you appreciate or value from this approach.

Speaker2: [00:26:48] If so, for example, the topics that (the texts) have. I think they're super cool. Kids like these themes. For example, the fact that they see as why in Global Citizenship is the subject of the conquest and all. Then they learn a little more about why they speak the language they speak, why they have these Spanish roots... they are interested in that topic. And science I think is what they like the most, because they discover, experiments are done, they discover more things, they already talk about animals, anyway, they are, they are topics that attract students' attention.

Interviewer: Author (Speaker1)

Interviewee: English Teacher - Fifth Grade (Speaker2)

Date and Time: Friday, July 23, 2021, 16h00

Speaker1: [00:00:01] The influence of STREAM on learning English... fifth grade students, then eh, with experience you have in fifth grade because we've worked several years, I'd like to know a little bit about your experience at STREAM, your your work, your opinion about everything related to this approach and what expectations or thoughts you have about the work that's being done. Then I'm going to ask you some questions and from those questions, then this is going to answer me, ok? Perfect, so we're going to travel back a little bit before we started teaching Stream. Well, they said to you, "Look, we're going to work like this and in this way with these books, this mode. And there's something called STREAM. When they told you it was time to... what did you think? What came to your mind? What? What? What? What? What did you have in mind when you listened to the term STREAM?"

Speaker2: [00:01:10] First of all, listening to STREAM was something I didn't know, well no, because no, I wouldn't know what STREAM means... nothing... For me it was: "STREAM, what's STREAM? At the time I was told STREAM meant that and this is then related to science, to Social Studies. Well, come on, because here you can. You can do a lot more with the students and I think it's very good. I thought it was good at first, but it kind of shocked me a little bit because we didn't know, but after finding out about STREAM, and I said you can get good things out with these kids because it was global. So, I said here we're going to dig a few things with the kids, even though the group was a bit complex. The kids, the point. But I was not satisfied because good results could be achieved.

Speaker1: [00:02:19] There, that's where my question went, no, we've been through that way of working for several years, not with this kind of modality, how do you feel? How has your way of working, of teaching, of, of reaching children through this modality of teaching changed?

Speaker2: [00:02:40] Taking into account that what is teaching during the pandemic, but this time has changed because we are online. Even though we're teaching online eh, I've noticed that students are becoming interested... even though there are topics that are a little let's say boring for them, but looking for them the need to put ourselves in their shoes, you can get it's good by telling you if I'm teaching... eh... Now that we're

reviewing... the right to vote, allows you to search for more information that the book gives us, right? To attract kids, because the information in the book suddenly is not enough for the kids to be attracted, so they know more about the subject. To tell you a topic there was today in which I found an Ecuadorian woman, by the way, who was called Matilde Hidalgo de Procel. She was born in Loja and was the first woman to have the right to vote here in Latin America. I don't know, something I've been able to do... they are subjects in which we go beyond what the textbook gives us, it makes us feel like the kids are more attracted to learning, right? Even though we're online, it's a little more complex that you don't see the kids there. If there are any errors, you fix them (...) but the guys are responding well. And I like it, I like it, I like it, I like how the kids are responding... it is to look beyond the brain that provides you. The book gave you a page, but you have to look for 2 or three more to hook guys who talk a little more than they really learn. I tell them learning is here, but they don't have to be satisfied only with the book information, but they have to go further, because the learning really is meaningful. And I like it, I like it.

Speaker1: [00:04:46] Now let's go back to the time when it started to implement, eh, the STREAM in (...) and, and here comes the question I was going to tell you... it was... well... Do you think that the institution prepared you or you, or gave you the necessary tools at the time to be able to teach under this new modality?

Speaker2: [00:05:13] No, no, no. Because the learning that we have obtained now is our work on a daily basis. The fact of being with the guys and working, seeing how this works. As a teacher, the day-to-day was what made us expert in this. Then the institution, they said. "We're going to work this way, we're going to teach with this, we're working like this ... let's work with this and that. After finding a way while working, learning daily how this works, even making mistakes, then for what... I can't tell you that the school prepared me, prepared us... he said: take this and this is what there is... come on.

Speaker1: [00:06:05] Of course, that's what it's all about, telling like it is. And just as for what you're talking about. Even though you sense that the institution is not or did not prepare us or did not properly prepare you for that fashion, do you feel that... that... did you miss that or not? Or said, with what I learned, with what I just feel, I feel good and maybe that doesn't, no, it wasn't so necessary.

Speaker2: [00:06:36] Of course, of course. A lot of times when everything is given, everything is given, it's not put in your hands, like you don't try very hard to learn then. So, they soon gave us that. We are no longer looking for ways to find our way, to

look for ourselves, to prepare. And you feel satisfied because you know that I prepared myself, it is not like that they gave everything in their hands, like when a father gives the son everything, everything, everything at the moment of considering life, then that son does not know what to do. I don't know... how we prepare, we prepare ourselves because I tell you, the school said: this, from there... prepare. We don't see ourselves fighting, fighting and I'm satisfied because I tell you, I've done well, I think I've done well. You know that sometimes there are mistakes that you make, well, but you've done a good job, you've done a job and you've seen the progress of the kids. And that's satisfying to me. When a boy starts to speak English, to learn English and he speaks to you the topics and the one who stays in his head and knows what it is about... communicating and receiving information. For me it's more than enough. (...) there's something new to learn. Every day

Speaker1: [00:07:52] Perfect. And right there. And these are my next two questions. First, what changes have you observed in the way you teach? Once we have implemented this modality of study and how do you think it has influenced your way of teaching?

Speaker2: [00:08:11] First. To be more patient, to support... the patience for the children. Because the fact that they are at home I cannot control them and see if they made a mistake I cannot tell them, you know? Or sit back with the camera on. I can't do it many times because they are, there they are. One world came there and I'm in another here. I try to link my world with theirs. But, for example, sometimes it is not so easy and at the time of... well... to teach with technology, learn to manage Zoom, learn to implement a vocabulary such as upload and download that (...) I like it, I like it. That is, at the beginning when we said we are going to have online (learning), that is going to be very complex, it is not going to be possible, we said. How are they going to learn? They're not going to learn... if 20 percent do it... that will be a lot, but they've learned a lot and I feel great because I feel so good. So yes, sometimes I even say you know that even though it's not beneficial for kids, that after all this time online, for them, it's good that kids are socializing in class with their partner, I like the online class as well. Because there are tools that can be used, that could be used... many that you can take advantage of and I like it, I like it, I like it, I like it... I feel like I am more complete in that part. There's a moment when I say- I should be in the classroom with the kids... I know I feel like I have to be with the kids in class, physically, dealing with them already now.

Speaker1: [00:10:03] Now that change. As for the students, how have you seen that the students... before STREAM one worked and taught in a way? And how do you see now that a STREAM teaches in this way? How? How did you? How do you see those students you've had?

Speaker2: [00:10:26] Because, well, long before these fit all this mode. The kids learned in the traditional way, right? Traditional... that he writes on the board, that he repeated it to him, right? But now, for example, I see that kids with technology that helps a lot, it is much easier for them to make an exhibition, present slides, present images (...) the work, what's more, is faster to work, because for example, if you realize that before all this happens, if your student... it's a student... was going to present... a presentation and his, his little poster stuck them on the blackboard, like he had to write and be marked here directly. Go, click, check the slides, upload a document... a document. Whatever mistake you made, reinvestigate very quickly there, and can correct it. I think so, I think it's fantastic. I mean, we're speeding up the message. Obviously learning has changed a lot. Before it was like more formal, it was like more... the teacher here, and the students there. Now, children even refute you because they have easy access to information. Think that you ask for an example of a verb, you can say GO, but no, you cannot, use another, but then you get refuted right there when researching on Google, YouTube... it is possible... it turns out that they also have the information there. Ok, well I can tell you are the owner of the information now. When you face the students, you don't think you show up unprepared because the kids are researchers, research, research... They investigate, investigate if they have come a long way in this. He's not the typical guy he creates whatever the teacher is called. And that's the absolute truth. Many of them research ... the information is there. Then they can refute a concept, some, something that you say. Then we have to be prepared, prepared with this new mode of technology control. And it's a challenge, a good challenge. It is a good challenge that helps us to prepare ourselves better, to be more optimal, with all the information we are going to give, because we have in front of us a sea of information. An ocean. That's right.

Speaker1: [00:12:55] Let's see, now... you, who, who mentioned the difference between traditional and current learning, do you think that kids learn more now, or did they learn English over the traditional way? You, who lived those two eras.

Speaker2: [00:13:16] I don't know if now, if we now do English in English. You have to... I don't teach English. I teach in English... do you see the difference? It means it's

more global now. Yes, right? It is quite right. Now much more is being learned because everything is already globalized. It was no longer focused on a single topic, and you learn more. Yes, if only the kids are learning more because they have more tools and more tools and more tools, because also the ease of listening to music, you can listen to a podcast, you can listen to a story that has subtitles. You have everything and now you are learning much more definitely than if not because you have said that technology is more needed. I have more at hand and to learn in the good way, the one who does not learn. Now I am very clear that there are tools that if we are not teaching in English. In English you learn a lot more.

Speaker1: [00:14:29] Now that... now that you are teaching subjects in English there is some... technique, strategy that you use or that you feel that... that is working for you when it comes to working that way teaching in English.

Speaker2: [00:14:45] Ehhh, I have the idea that the English teacher has to speak English all the time, speak English and make the class enjoyable. If there is a topic that is a bit boring, then find a way to make it fun... to attract and little by little the guy connects because he connects in English... if he knows that in a week I've learned 10 new words, I don't know... if the boy has learned 10 new words. Well, enough is enough, enough is enough. In other words, it is not enough, but it is progress. It's a breakthrough... Definitely... I speak English all the time. I speak in English all the time. Then I say... those kids are learning that way. (...) then, the kids will learn. And I say the method I use is... they first learn to communicate. Suddenly no, no... we're talking about... let's learn about... about nature, no, but I'm talking about it and... If a guy says he knows I don't, I don't know how to say that. I give you the idea to talk... I say: how do you say árbol in English? But that kid already knows it... he's not going to ask cómo digo? but how do you say tree? That little phrase has been around his head and... the next day he's not going to ask you “¿cómo se dice en inglés?” ... He will tell you: How do you say o how do you pronounce? Or how do you write? This method... The guys feel like it's already... and mom or dad and uh, the boy didn't know anything, but now he says how do you say? so to speak then in that medium that using is doing what the kids improve. I like it because first you have to give to receive.

Speaker2: [00:16:40] I'm giving English to receive English, because if I speak Spanish the kids speak Spanish, so I don't give you anything at the beginning that lasts you a month or two brighter than me, the kids are feeling, feeling, feeling, feeling better about

it and that method works for me because you're someone. The guy speaks to you in English, that's the English teacher, that's the one who speaks in the yard, in the library, everywhere, that's the English teacher. And to that teacher... I'm going to speak English with that teacher because that's how I adapted and I had to little by little... the kid is like a baby, he starts walking, you give him, and you start shady at him. And then after about three or four months that baby starts walking alone, it's exactly the same way I work with my students... I help them and then... just little by little they are, you know, speaking English. First, they are here... and then (...) Then, and I, who has always worked for me and make the class enjoyable, try to put myself in their shoes, at that age or the kids at that age, so that they feel that we're in the same, the same... in the same mood for learning. Yes, it has worked for me.

Speaker1: [00:17:54] At the time, obviously you can always improve. Well, em. In this case... eh... Here comes the question: What can be done? Or what changes could be done, since... since... from your role as a teacher and then from the institution as the one that organizes and determines how it is taught or what is done, or rather, what is taught, improve learning from the... from the STREAM method? What can be improved? First from your role and then you can mention something about the institution.

Speaker2: [00:18:30] Okay. First, select the topics in stream, select the topics that are... very, very relevant topics... very... or topics that are really important, phew! That the subjects for the kids become very important and interesting, because even a girl the other day said, last week, a girl told me... Mister, but the words we are checking... they're not very common... but I made them understand these words you do not use them now because you are little children. But this vocabulary... you're going to use it, because at one point you're going to be voters, voters, these words are going to be very common in you. Suddenly not, not now, but then I started to really think there are issues that... they are not very relevant by local criticism or to the topics that are relevant. And on those issues, you can bring out the best, get the best. For example, I sometimes go as we've made this book one or two, let's take out the topics that are very important, topics that the kids who need to really learn it and move forward first on those topics are going to learn from each other.

Speaker2: [00:20:04] To give the tools and facilitate kids to investigate, to investigate, to investigate, to give more speaking. Giving them more writing is something we're not doing. That more children can write... that they make compositions on this subject, when the kids begin to write, to give it more vocabulary... definitely, we are going

to move forward ... in English kids progress a lot, improve through compositions, vocabulary, repeating vocabulary. If we checked vocabulary last week... vocabulary, vocabulary, because as that their vocabulary brings it up again towards vocabulary review, the kid gets vocabulary... the compositions, investigate, that believe that they have to give them examples. Ask for any opinion, opinions... then those guys are staying and believe me that English is going to improve. And another thing, I think well, that's in the part of Language... add more grammar. No, since this is STREAM grammar is needed to improve English in STREAM, right? like those issues that are very relevant, work on them, work on those relevant issues. That's very important, isn't it?

Speaker1: [00:21:27] Now, eh... I also asked you a little about the institution, what do you think of the resources offered by the institution in relation to your teaching process?

Speaker2: [00:21:41] Eh... Well... well, there are certain tools... right?...

Speaker1: [00:21:48] Sure. I mean, I know that at the moment most of the time we work at home and use our own resources but try to imagine you are in the... in the classroom. when you went to the classroom... when you were going in a... in a... in a world without a pandemic, what? what? What? What did you feel about the resources you received to be able to organize your work?

Speaker2: [00:22:15] Well, in that case I liked it and it was also my duty. We have... another thing... another thing that... and I think the institution should add internet on the school's iPads... because the iPads were useless at some point, but they were there simply... And I felt limited. The rest, for example, to have the projector, to have internet access for teachers, to have those things. Yes... they were pretty good, because... all of a sudden... yes, yes, you needed to check a topic with the students, you showed a video from YouTube, and worked based on that... the speakers and all. But... internet on the iPads like that... in my opinion... it was missing a little bit because the kids also need to work and that limited them in some way. Yes.

Speaker1: [00:23:10] Now. eh. And as for the texts that are used... because that is also a resource, isn't it? What is your opinion about the texts that are used?

Speaker2: [00:23:22] OK... look. In my very personal opinion... I always say this... those textbooks. To me personally... that no, no, no... that wasn't an obstacle, because even when books were limited, no, before there were limitations... and went beyond the book. I prepared, for example, things... to tell you, to tell you. If there was a

very poor book is that when I went on and said... but these guys weren't learning from this book. But I went further and looked, researched, I would include topics that weren't in books and, even my peers... they said to me: hey, they are kids, but this topic, what are you doing? I said, but these topics were vital for them, for them to learn. And my partners got stuck with that impression and... I said... books don't need to limit you, you can go beyond that, look beyond that, because you make the book and not the other way around ... if that book has that, I'm going to look for more books. We work for the kids' well-being, and we cannot limit ourselves, we cannot. We are intelligent people; we are people who are going to look for more resources. And I, when I had no more resources, look for more than the book would provide me.

Speaker1: [00:24:57] Now. Aha. And now, eh, look... Obviously, as we are talking about the subject of this conversation, it is in learning English with subjects, but obviously also at the time... we are part of a generation that learned English in another way, right? in a very different way. What? ... What space can you have, if that is possible, that that traditional learning of the language... of a foreign language can have in this way of learning English that we have now? Is there some space? Are they compatible? Do you think it is that no, that no, it has nothing to do with each other? Or how... how can we make them live together? What do you think?

Speaker2: [00:25:52] Look, (...) I sometimes tried and the kids sometimes.... If there is a topic here that I learned this way, I said this last week... I want you to tell me... a child who was called (...) and I said: women have been fighting for the right to vote, because kids can read it... but you have to see if you understand it ... who understands this in Spanish? and he's very good, but, no, no, because he didn't know, he didn't know what to say... what is it...? Ah, han estado luchando, and there everything was connected... Oh, OK; OK; OK. And he said another sentence that he didn't translate, but he understood that now. What I mean is that... translating isn't bad all the time the way we learned, we can also apply it to us as to connect... compare the English language with Spanish and connect them. You're not going to be translating all the time. It's kind of the way I learned, isn't it? And that I applied it with my students. Because, for example, I say to a kid... read, read this... and if they start reading... and I ask them what they understood from that... and start (thinking).

Speaker2: [00:27:19] So I'll do it. Tell me, tell me what you understood. Then, if you have a little bit of Spanish... what did you understand... and the kids thinks and

connects with English, because if they had a way to connect languages so they know how Spanish and English work. For me, for me, translation is not bad for students, it is something that can be learned. So, if I can help someone... Do you know what? Translate this for me. If you. If anyone thinks of you, José Luis, who wants you to serve as a translator, I want you to translate this. I'm going to speak English all the time. A gringo comes... wants... cannot speak Spanish... says... that you are my translator, what do you do? He comes here, speaks English to you... you translate. You're translating, right? Translation is not bad when used all the time, because you are always translating, right? But... but... I tell you that part of translating, I do not see it too bad... I can apply that.

Speaker1: [00:28:20] Now, now, in the last question it says... eh... We've already been talking for almost half an hour about STREAM. Surely, it's something that has its good things, and they have their bad things, like everything else. But if you had to take something from that way of teaching— through STREAM – that you say this is the most important thing. This is the most valuable thing I can take from this focus... What would it be?

Speaker2: [00:28:50] The globalized way, the global way of working. That's important. The global approach...not only in something micro, but in the macro. Well, they can tell you about what's happening here in Ecuador or what's happening in China, in Europe, in Africa, it's global. So, that global way of studying some... globalized... compare an issue that happened here, which would be, for example, elections in Ecuador... that women could not vote in Ecuador, what happens in New Zealand... in Africa, what happens in the United States... it is global. So, for me, that's important because you take kids around the world and that makes them like... expand... go beyond and that is very important... teach globally.

Speaker1: [00:29:43] Eh... done. Well, I'm going to stop the recording.