

UNIVERSIDAD INTERNACIONAL DE LAS AMÉRICAS
SCHOOL OF EDUCATION AND FOREIGN LANGUAGES

Bachelor's Degree in English with Concentration in Teaching

**The Use of Artificial Intelligence (AI) Tools as a Strategy to Enhance Writing Skills on
Fifth Graders at Escuela Carlos Sanabria Mora in Pavas during the Second Term of 2025.**

Gloriana Azofeifa Ramírez

Rigoberto Gutiérrez Albenda

San José, Costa Rica

2025

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Chapter I

Introductory Framework

Introduction

Artificial Intelligence (AI) has been permeating our daily lives, and little by little, education as well. Teachers have at their disposal digital tools that can help them with lesson planning, giving feedback, supporting students in their learning, and many more things. Regarding of English as a Second Language (ESL), these tools can be a great help in developing skills like reading, speaking, and, specially, writing.

Writing is a very important aspect of English learning. Through writing students organize their ideas, practice vocabulary, and apply grammar rules in a meaningful and appropriate context. However, for many young learners, writing in a second language is difficult and sometimes discouraging when they do not get enough guidance or feedback. This is a common scenario in public schools where big classes and lack of resources make it hard for teachers to attend the individual needs of their students.

In Costa Rica, the Ministry of Public Education (MEP) sets the goal of developing communicative abilities in English from earlier first grades. However, despite that, many fifth graders still find writing tasks difficult. They struggle with choosing the right vocabulary, making their sentences complete, and being clear and coherent in their writing. The same challenges were found at Escuela Carlos Sanabria Mora in Pavas where the students involved in this study showed similar needs in their English lessons. Given those difficulties, this work stems out a need to explore how AI tools can support writing instruction in a primary school setting.

Tools like ChatGPT or Quillbot are able to give immediate suggestions and corrections, and this can help students revise their work and comprehend their mistakes better. In the right and responsible teacher-guided environment, these tools can be a useful complement of traditional instruction as they provide many more opportunities for students to practice and get better at their own pace. This research is focused on the use of AI tools with fifth grade students

at Escuela Carlos Sanabria Mora during the second semester of 2025. It relates the students' opinions and attitudes towards the use of these tools, it describes the impact on their writing development throughout the process, and it also analyses the benefits as well as the limitations when introducing AI in writing lessons. The goal is to contribute practical and down-to-earth insights that may help teachers to bring these technologies into classrooms in a safe and meaningful way within the Costa Rican educational context.

Problem Statement

One of the hardest things for young learners to handle is writing in English, especially those students in public primary schools who hardly ever get to use the language outside the classroom. Many children do not even have the idea of how to put their thoughts on paper, selecting the right words may be a mystery to them, and they might even be unsure of what grammar rule to apply. Thus, their writing works frequently contain repeated errors, are made up of very short or incomplete sentences, and they have problems presenting their ideas in a logical way.

These kinds of problems with writing are very common in Costa Rican primary school students of fifth grade; the same goes for the kids from the Escuela Carlos Sanabria Mora in Pavas. During English lessons, some learners expressed insecurity when writing and often waited for the teacher to correct every detail before continuing. This teacher's dependence contributes to their slow learning of new skills and does not allow them to practice writing independently. Moreover, teaching many students per class and the shortage of class hours do not let the teachers give each student the support they need.

Therefore, the main question of this research is how fifth-grade students' English writing skills can be enhanced by AI means and in what ways these instruments can be considered as part of a learning process that is both meaningful and guided. Knowing that will provide teachers with a clearer idea of the possible use and limitations of AI in primary education and ways to better assist students in their writing skills development.

Objectives of the Investigation

In order to achieve the purpose stated before, it is necessary to set the objectives of the investigation. As Ferraro (2012) notes, research objectives define the investigator's purpose,

guide progress, and structure the study. They are the foundation of a well-planned investigation. This means that the objectives point out a line that delimits the study. Without the objectives correctly determined, the investigation might not have an established path to follow, and it would be extremely difficult or impossible to achieve the settled purpose.

General Objective

To demonstrate the effectiveness of Artificial Intelligence tools as a strategy to enhance writing skills in fifth graders at Escuela Carlos Sanabria Mora in Pavas during the second term of 2025.

Specific Objectives

- To identify key elements of Artificial Intelligence for writing skills improvement.
- To implement Artificial Intelligence tools for supporting the development of writing skills.
- To evaluate the impact of Artificial Intelligence based activities on writing skill development in fifth graders.

Justification of the Study

Incorporating AI tools in learning are a great way to modernize traditional teaching methods and provide solutions to current problems in English education. It has been observed that the English department is well strengthened in different Costa Rican schools; however, the students still fail. Grammar, vocabulary, and text organization are the areas in which many fifth-grade students have had difficulties in making correct statements in Costa Rica. These constant problems point out that a primary school writing program needs innovative strategies that can help writing development in primary education.

This research serves as a foundation to explore the potential of AI tools as learning tools. It also makes a significant contribution with respect to the scarce research on AI writing in primary schools in Costa Rica. In essence, the results are meant to bring about a positive change in students and teachers.

Furthermore, the research contributes to the academic field by addressing a relatively unexplored area in local education. By focusing on fifth-grade students at Escuela Carlos Sanabria Mora, the study provides contextualized insights that can inform future educational policies, teacher training programs, and curriculum design. Ultimately, the findings are expected to benefit not only students but also teachers, school administrators, and educational stakeholders committed to improving English language learning in the country.

Antecedents

The incorporation of Artificial Intelligence (AI) into language education has received growing attention in recent years, particularly for its potential to improve specific language skills such as writing. Several international studies have highlighted the positive effects of AI-powered tools in supporting the development of writing proficiency among English as a Second Language (ESL) learners.

Kumar & Boulanger (2021) found that Grammarly improved grammar, sentence structure, and learner autonomy in university ESL students. Similarly, Yin & Wang (2022) demonstrated that tools like ChatGPT and AI feedback systems enhanced writing fluency and coherence. These tools were shown to provide real-time support and reduce anxiety associated with traditional peer and teacher correction.

Bashir et al. (2023) observed that AI chatbots increased motivation and engagement among young learners when used with teacher guidance. Their findings suggest that AI can be a motivating and engaging tool, particularly when combined with teacher-guided activities. The study emphasizes the importance of adapting AI tools to age-appropriate content and instruction to maximize their effectiveness.

In Latin American, research remains limited, but there is a growing interest in integrating AI and educational technologies in public education systems. Rodríguez & Jiménez (2020) conducted a study in Costa Rica focusing on the impact of digital tools on writing improvement in fifth graders. Although their work did not directly involve AI, it highlighted the students' need for immediate feedback, interactive platforms, and tools that support vocabulary development and sentence structures that AI can effectively address.

These studies collectively show that AI tools, when properly implemented, can provide personalized feedback and foster writing development. Yet, the application of AI in Costa Rican public schools remains largely unexplored, this study seeks to address that gap.

Scope of the Study

This research analyzes the effectiveness of AI tools in enhancing English writing skills among fifth-grade students at Escuela Carlos Sanabria Mora in Pavas during the second term of 2025. The participants are students aged 10 to 11. AI tools such as Quillbot and ChatGPT is used as supplementary resources during English writing lessons.

The study focusses on grammar, sentence structure, vocabulary, and organization. These tools are integrated with the national curriculum and used under teacher supervision. Data is gathered through writing samples, observations, and student questionnaires to assess progress, engagement, and perceptions.

Data will be collected through pre- and post-intervention writing samples, observation, and student questionnaires to evaluate the students' progress, perceptions, and engagement with the AI tools.

Limitations of the Study

Several limitations may affect the study. First, the research is conducted in a single public school, which limits generalizability. The outcomes of the study are directly influenced by the specific educational, social, and infrastructural context of Escuela Carlos Sanabria Mora. Additionally, the intervention will take place only during the second academic term of 2025. This short timeframe may not be sufficient to observe long-term improvements in writing proficiency or the sustained impact of AI tool integration.

Another important limitation involves access to and familiarity with technology in public schools. Many public institutions in Costa Rica face challenges related to the availability of digital devices, internet connectivity, and technological infrastructure. As a result, the

implementation of AI tools may be affected by logistical and resource constraints. Furthermore, some students may have limited experience using such digital platforms, which could require extra instructional time and reduce the effectiveness of the intervention. Lastly, the AI tools used in the study may be limited to free versions, which typically offer fewer features compared to premium versions. This could restrict the depth of feedback provided to students and, consequently, the level of improvement in their writing.

Despite these limitations, the study aims to offer valuable insights into the potential of AI tools to support writing development in primary ESL contexts.

Chapter II

Theoretical Framework

English Language

English is a unique and significant language that holds a special place among the world languages. To put it simply, English is spoken by more than 1.5 billion people worldwide, including both native and non-native speakers. Therefore, the English language has evolved into a global lingua franca that unites communication across different linguistic and cultural areas (Crystal, 2003). The English language is the core used in international diplomacy, scientific research, higher education, global commerce, tourism, and digital communication. So, English is not simply a language but rather the main channel through which today's global knowledge, culture, and technology are accessible and transferable worldwide.

The widespread use of English worldwide is primarily influenced by and has profoundly shaped globalization. In fact, its unbounded diffusion through media, the internet, and international business has made it what it is a "world language." Besides, English serves as a bridge language, facilitating communication among multilingual societies and within international organizations. In these institutions, the language is most commonly used for instruction at the tertiary level and academic publishing.

Nevertheless, the global dominance of English entails some challenges in terms of linguistics and culture. Although the language connects its users no matter where they are, it also has the potential to make local languages and knowledge systems become marginalized if proper integration in education systems is not considered. Hence, amid the significance of English as a worldwide accepted language, it is indispensable to co-exist with other languages and also ensure the presence of multicultural perspectives (Phillipson, 2009).

Importance of English as a Second Language in Primary Education

Within this scope of ideas teaching English as a Second Language (ESL) in primary school can be viewed as a developmental pathway that allows young learners to access

worldwide resources and opportunities; thus, they become potential participants of intercultural exchanges and international dialogues (Crystal, 2003).

Besides, early introduction of English language has effects far beyond merely learning a new language as it also supports cognitive flexibility, critical thinking, and problem-solving skills. According to Bialystok (2001) bilingualism promotes brain executive functions that are crucial for academic success. Kids, who start the process of acquiring a second language at an early age, are likely to have better attentional control, enhanced memory, and higher capability of switching between tasks. These mental skills turn into better overall academic performance and even in math and reading comprehension, for instance, they can excel more than their peers.

In addition to cognitive benefits, very young learners acquiring a second language will have in the future easier and more successful language learning experiences, which will eventually lead to a more positive attitude towards language learning. Normally, kids are more explorative and less self-conscious than adults, which makes language risk-taking more likely, so they are encouraged to speak more fluently. Aside from that, their brains are more open to new phonological patterns, thus they can obtain correct pronunciation, and listening skills without difficulty (Lightbown & Spada, 2006).

From the perspective of the present interconnected world, being proficient in English is not just a thing that sets one apart from the rest, but it is a necessary skill that one has to have in many professional and academic contexts. This demand for English in the global job market and higher education institutions is growing by the day, and, consequently, it makes living and working in a borderless world difficult without this important skill. English learning at the primary level is thus a steppingstone for young learners in Costa Rica, leading to a range of educational, technological, and career opportunities in the future. To cite a simple example, several universities in Costa Rica require English proficiency tests for admission or graduation, and many job advertisements offer positions in industries such as tourism, customer service, and IT, where English is a must-have skill.

Learning English is not only a doorway to economic benefits but also broadens students' access to information resources. Most of the content available on the internet is in English, be it scientific publications, online tutorials, video lessons, or virtual tools. Accordingly, students who excel in English at an early stage will turn out to be self-directed learners with capabilities of

digital navigation and are able to tap into a wider pool of knowledge and views (Warschauer, 2000).

Furthermore, learning English helps students develop intercultural competence as they get acquainted with diverse ways of thinking and communicating along with exposure to the English language. Through songs, stories, videos, and classroom activities, learners begin to understand the values, customs, and traditions of other cultures, in other words, these mediums help the students to become more tolerant, empathetic, and globally aware. This is especially useful in diverse communities where multicultural education can significantly contribute to the elimination of prejudices and the building up of positive and inclusive attitudes (Byram, 1997).

In conclusion, teaching English is not just concerned with one aspect of language acquisition but it is also about providing learners with the necessary tools for their future lives which include 21st-century skills such as digital literacy, cultural awareness, and critical thinking. If done properly and as part of a well-planned primary curriculum ESL education becomes a source of power and opportunity for students. They not only get to interact, learn, and live with their local communities, but they also get linked to the worldwide network of people and cultures, thus becoming prepared for a world that is to a great extent interconnected.

Second Language Acquisition (SLA)

Second Language Acquisition (SLA) is a process in which humans acquire a new language that is not their first. Theories explaining this process and the factors affecting it were developed throughout the years. One of the major points of view is Krashen's Input Hypothesis, which argues that language advancement happens when learners have access to some input that they understand but is a little beyond their current linguistic level (Krashen, 1982). This concept calls for less formal teaching and more interaction, and it also points to the importance of reducing anxiety in the class so that students can learn language in a natural way.

Vygotsky's Sociocultural Theory is equally helpful for understanding SLA, as it also focuses on the role of interaction in social and cognitive development. Learning, according to this model, happens in the Zone of Proximal Development (ZPD), which consists of those tasks that children can do with help but not yet independently (Vygotsky, 1978). In an ESL setting,

teachers and classmates who are more competent can be seen as the “more knowledgeable others,” providing guidance and support that help students gradually become independent and skilled.

Moreover, the Affective Filter Hypothesis is equally important, as it addresses the influence of emotional factors on language acquisition. If a learner is in a state of high anxiety, low motivation, and lacking self-confidence, their ability to acquire a new language decrease dramatically. On the other hand, if learners are in a good learning environment where they are safe, encouraged, and motivated, the affective filter is lowered, enabling more efficient language acquisition.

English Language Barriers.

Learning English as a Second Language (ESL) in primary school can be quite challenging for children. The challenges mainly arise when children do not get enough input, practice, and support. These difficulties become more apparent in public education systems in developing countries such as Costa Rica, where English instruction is affected by socioeconomic inequalities and infrastructure limitations.

Limited exposure to English outside the school setting is one of the most significant issues. García and Wei (2021) state that language acquisition is much faster when learners are immersed in the target language in natural settings. Still, many Costa Rican students have English only during a few periods of the week, and teacher-centered classes with less teacher-student interaction are the norm. Therefore, students fail to absorb the vocabulary, grammar, and correct pronunciation effectively. They do not have enough opportunities to communicate; therefore, they are unable to develop automaticity, which is a prerequisite for fluency (Nation & Yamamoto, 2012).

Moreover, the first language (L1) interference has been a major contributor to ESL writing and speaking for a long time. Spanish-speaking learners frequently have problems with English phonology, syntax, and tenses of verbs. For instance, if errors like “He have” instead of “He has” or “She go to school yesterday” are made regularly and are not explicitly corrected through guided practice and feedback, the wrong forms will always be used. Cross-linguistic

influence is the main factor behind second language acquisition at the early stages, and hence contrastive analysis, along with metalinguistic awareness activities, should be used to help learners overcome this, according to Ortega (2020).

The issue of lacking digital and print materials is another one that seems to have no end. Pupils from poor families may have limited access to English-language books, streaming content, and educational technology at home. This greatly restricts exposure to the language and the learners' ability to consolidate and extend the knowledge they have gained at school. The digital divide is still the main challenge in Latin America, according to UNESCO (2022), where schools in urban areas might have better facilities and digital tools but schools in rural areas or disadvantaged communities do not.

Moreover, socioemotional factors should not be overlooked, as they can affect learners' performance in language acquisition. Anxious, unmotivated, or unsupported learners in a learning environment are not likely to use the language in new situations. MacIntyre and Gregersen (2022) report that language anxiety has a negative effect on oral and written language skills. This problem can be felt more in large classes where students get less individual attention, and feedback is usually slow or superficial.

Furthermore, students may lose their motivation to learn and may be hindered in their learning progression due to instructional barriers such as outdated teaching methodologies or an insufficiency of teacher training. Even though the Costa Rican Ministry of Public Education (MEP) has been actively promoting communicative and task-based learning approaches that are in harmony with the CEFR, implementation by teachers is often ineffective due to a lack of teacher training and teaching resources. There is an improvement in the policy framework, but the gap between practice and policy is due to systemic issues like curriculum overload, large class sizes, and the lack of continuous professional development, as found in a recent Inter-American Dialogue (2023) evaluation.

To overcome these obstacles, schools should implement tiered approaches that encompass not only the learners' language needs, but also their emotional, technological, and pedagogical contexts. This would facilitate professional development opportunities for ESL teachers, allowing more people to access English-rich digital environments and use learning practices that help learners build confidence and become more involved in the learning process.

Role of English in Costa Rican Education

In Costa Rica, English is not only considered a subject to be taught in schools but also an essential tool for the country's development, particularly in the context of globalization and the digital economy. The focus on the English language from the early years of schooling is just one part of a larger vision: to make sure that students are ready to engage in a world that is increasingly interconnected and in which English is, in the majority of cases, the language used in business, science, and international collaboration.

Significant steps have been taken by the Ministry of Public Education (MEP) to improve English teaching in public schools by making the national curriculum compatible with the international standards, reflecting the levels described in the Common European Framework of Reference for Languages (CEFR). The latter sets out language levels in a transparent way, thus ensuring that learners are going towards communicative competence instead of short-term memorization of grammar rules or words. As a result of this change, Costa Rica has adopted skills-based language-learning methods focused on the four language skills through communication. The use of language through a real-world approach and task-based instruction focuses on situations learners encounter in their daily lives and motivates them to spontaneously use English, which is better suited to the requirements of the contemporary world.

English plays a double role in the Costa Rican education system, one as a hope and the other as a reality. It is a hope since language learning leads to global citizenship and intercultural understanding. It is a reality since learners acquire the necessary language skills for their studies and work in the future. To achieve this, a comprehensive approach involving not only policy efforts but also classroom practice, teacher development, and equal access to resources is needed.

Writing Skills

Among the different modes of language learning, writing poses a situation so complex and requires such high ability that it is considered to be the most complex of them all in the field of second language acquisition. The major reason behind this is that writing goes hand in hand with not only one but several different varieties of language knowledge; more so, it is a brand-new work of cognitive processes, and finally, it needs the input of the communicative intention.

Writing is different from speaking in a way that the latter usually gives room for spontaneous expression and immediate clarification, while bordering on the former, we see that it necessitates a considerably heightened level of accuracy, structure, and organization. In the field of ESL education, enhancing writing skills implies that one has to transcend beyond the limitations of grammar and vocabulary and that it comes down to really instructing the learners on how to proficiently express themselves, organize their thoughts, and adequately modify their language for different readers and purposes. Besides being a language skill, writing is one of the fundamental ways that eventually helps children develop their brain capacities through the process of planning, reflecting, and critical thinking.

Firstly, SLA is a term that describes the acquisition process of a language other than a learner's mother tongue. Numerous models to account for this process have been put forward. Among them, Krashen's Input Hypothesis is considered to be the most influential one, postulating that learners absorb a language when they are given input that is not only understandable but also is slightly new to them (Krashen, 1982). In support of this view, the theory is very communicative, and it recommends that language learning should take place effortlessly in quite low-anxiety environments.

The importance of another theory, Vygotsky's Sociocultural Theory, cannot be overshadowed, as it emphasizes the major role that social interaction and cultural tools have in one's cognitive development. Vygotsky (1978) suggests that learning takes place in the Zone of Proximal Development (ZPD), which is a zone where learners carry out a particular task with the help of a more knowledgeable other. In a typical ESL classroom situation, teachers and classmates thus become these facilitators, giving learners support that is gradually withdrawn as they gain more independence.

The Affective Filter Hypothesis shows that SLA is largely influenced by the emotional factors of the learners. Unfortunately, learners with high anxiety, low motivation, and a lack of self-esteem will acquire the new language very ineffectively. To be sure that the negative impact of the affective filter will be minimized and language acquisition enhanced, it is necessary that a positive and supportive classroom atmosphere be established.

Theories of Writing Pedagogy in ESL Contexts

The different strategies for teaching writing in ESL have been a significant focus of research. Various theories have been proposed to shed light on how learners can develop writing skills more efficiently. The process writing approach, whose inception is largely credited to the work of Flower and Hayes (1981) and is one of the most influential concepts, significantly changed the landscape of writing instruction by viewing writing as a recursive, multifaceted cognitive process rather than a one-step act of producing a final text. The authors argue that writing, in this case, should not be seen as a simple one-step process but rather as a series of steps, planning, drafting, revising, editing, and publishing, through which writers are always engaged. It also suggests that teachers should not only check the correctness of the product but also give students opportunities for self-regulation and reflection. This view is very beneficial for young learners, as it helps them develop the necessary attitudes and skills for progressive improvement in their writing despite inevitable language barriers at the beginning.

The genre-based pedagogy is another major approach that focuses on educating the learners about the social functions and the grammatical standards of different kinds of spoken and written communication (Hyland, 2004). By understanding the distinctive features and requirements of genres such as narratives, descriptions, and argumentative texts, ESL learners become more confident in organizing their ideas and using language appropriately. The method not only facilitates learning to write but also serves as a good match between the teaching program and the students' needs. On top of that, the approach supports the use of explicit language instruction focusing on the functions and structures of discourse that are problematic areas for second-language writers.

Employing AI tools in writing instruction can be an excellent support for the above-mentioned pedagogical theories, as they can cater to the recursive nature of the writing process, provide immediate and personalized revision and editing-stage feedback, and provide learners with the guidance needed to understand genre conventions. This is because intelligent writing tools can be highly effective for error checking and vocabulary improvement, and clients can receive sentence correction advice. However, it is still crucial that the teacher-student interaction is not substituted by AI interaction. The role of the teacher in aiding student understanding of AI

feedback and encouraging engagement with higher-level thinking is not diminished in any way, especially in primary schools where introductory literacy skills are being developed.

Characteristics of Writing in ESL Contexts

Writing in a second language is a highly intellectual task that requires language learners to coordinate different abilities at the same time. Besides grammar and vocabulary, ESL writers also have to come up with ideas, plan their writing, and choose the right words for the purpose and audience. The complexity of writing makes it the most challenging skill for language learners to master.

Moreover, writing is influenced by cultural norms and rhetorical patterns that vary across languages. ESL students frequently encounter the challenge of adapting their writing style to the standards of English academic discourse, which may differ from their first language. Knowing the genre-specific structures and expectations of the audience is crucial for writing logical, culturally appropriate texts (Lee & Swales, 2021).

On top of that, writing includes higher order thinking skills such as analysis, synthesis, and evaluation. These intellectual operations can be challenging for ESL learners who are also trying to improve their linguistic proficiency and academic skills. If students do not receive explicit guidance and sufficient practice, they may find it challenging to present their ideas logically or to use complex language to express their thoughts (Chen & Graves, 2020).

The teachers can help ESL writers by providing clear instructions, demonstrating effective writing strategies, and offering helpful feedback. This assistance makes students more confident, and thus they become increasingly independent in writing. As students commit to revising and reflecting, they not only develop their grammatical skills but also their capacity to use language effectively in different situations.

To sum up, writing in ESL contexts is a complex and challenging skill that requires not only linguistic knowledge but also cognitive strategies and cultural awareness. To build solid writing skills, instruction has to be deliberate and long-term, thus preparing and supporting the students for success.

Common Writing Challenges

ESL learners, in fact, have a hard time with writing skills. They are prone to make mistakes such as subject-verb agreement issues, strange sentence structures, and limited vocabulary. All these language problems lead to a lack of coherence and cohesion in their writing, so it is hard for them to develop their ideas clearly and logically. Studies show that the major reasons these problems persist are insufficient feedback and few opportunities for revision, both of which are very important for students to internalize correct language forms and improve their writing quality (Graham & Perin, 2020).

Not only that, ESL writers of the younger generation may also experience cognitive and organizational issues, in addition to making grammatical mistakes. It is particularly hard for them to come up with ideas and organize them in writing if they lack sufficient knowledge or have not been exposed to different kinds of texts. Moreover, learners might find it difficult to comprehend the objectives of the assigned writing tasks, resulting in works that lack focus and clarity. The result can be vague or disconnected writing that does not meet the requirements of academic writing.

The process of tackling such problems necessitates an all-encompassing instructional strategy that includes explicit instruction on writing norms, along with sufficient practice opportunities. Engaging students in good writing practices, providing personalized feedback, and motivating them to continually revise their work are key elements that not only help to improve learners' linguistic accuracy but also develop higher-order writing skills. Besides that, helping students understand the task's purpose and their audience will lead to writing that is more purposeful and coherent (Hyland & Hyland, 2021).

In synthesis, the main writing challenges in ESL environments can be addressed only through constant, scaffolded support. Learners, given they have appropriate instruction and sufficient practice, will be able to improve their skills in arranging ideas, following language rules, and writing effective texts.

Stages of the Writing Process

The writing process, a familiar concept, is recognized as the five interconnected stages—prewriting, drafting, revising, editing, and publishing—through which students are led to produce clear and coherent texts. Here, the writing is considered not a final single product but an evolving process of discovery and refinement. This viewpoint, supported by Graves (1983), thereby sees children more involved with their own ideas and thus developing not only creativity but also critical thinking as they create their own meaning through writing.

In the case of ESL primary education, the crucial thing is to make each writing stage adapted to the language development needs of young learners. The students may engage in brainstorming, mind mapping, or vocabulary enrichment during the prewriting phase to generate ideas and build the necessary linguistic resources. This support is very important for students who may not have enough language exposure and are not very confident in English.

The primary focus of the drafting stage is to put the ideas on paper without the pressure of grammatical accuracy. At this point, the teacher should encourage the student to express him/herself freely, thereby relieving anxiety and developing fluency. The stage is mainly helped by the teacher's guidance that content and organization should be chosen over surface errors.

Also, revising and editing are not only different stages but also different functions through which learners improve the clarity, coherence, and correctness of the text. Revising is about changing the structure of ideas, adding new ideas, and improving the overall message of the text, whereas editing tasks are about fixing grammar, spelling, and punctuation. In ESL classrooms, comments from teachers and peers are always welcome and necessary for students, as they provide the direction and support, they need at various stages. Besides, they improve both language skills and writing quality.

The final stage of publishing is when learners can show their finished pieces to an audience, e.g., friends, teachers, or parents. Apart from giving students a sense of their own worth, this also helps them grasp the communicative function of writing. Motivating students by offering them the opportunity to display their pieces or read them is one of the many effects of publishing, which leads to a positive attitude toward writing as a social activity.

So, the staged writing process, adjusted for young ESL learners, is a good tool to support gradual language acquisition and foster cognitive and linguistic development. Students are given the power to be reflective writers who see writing as an ongoing process rather than a one-time task (Graham & Harris, 2019; Zhang & Qin, 2021).

Technology in Language Learning

The use of technology in foreign language learning has radically changed the traditional way educators taught in the past. The teaching then became more interactive and engaging to the learner. Various digital programs give learners access to authentic language through podcasts, videos, and other resources, along with real-time conversations with native speakers. This, in turn, helps learners better understand the language and culture. These learning tools address students' different learning styles. A student can thus see, hear, or even do and learn from that more easily as the language is mastered at a deeper level.

Besides that, technology enables a language learner to have personalized learning. To be more specific, language apps and platforms use techniques such as gamification, spaced repetition, and instant feedback to make vocabulary and grammar exercises more engaging and effective. At the same time, the use of technology in language learning keeps students independent, making them responsible for their own learning. They are most at liberty to study as they adhere to the parameters that make language learning a must, such as continuous exposure to the language and constant practice.

More than that, technology opens new ways for foreign language learners to collaborate and communicate even after class hours are over. ESL learners get in touch with other students and teachers from all over the globe via technology, which takes the form of virtual classrooms, chat rooms, and other educational platforms. Consequently, technology serves as a medium through which learners' language skills are enhanced, and they are also prepared for the challenges of a digital world driven by technology.

Role of Educational Technology in ESL

The application of educational technology in second-language acquisition has changed the strategies students use to interact with content and develop language skills. Digital tools open the door to authentic language materials, interactive exercises, and multimedia resources that can be used by different learners (Chapelle, 2001). In ESL classrooms, technology helps students access materials to listen to native speakers, participate in online writing tasks, and receive automated feedback.

Technology in education enables student-centered environments where learners can move through the content at their own pace and return to it when they want. Language learning apps like Duolingo and Quizlet use gamification and spaced repetition to help students learn vocabulary and grammar in a way that is both motivating and efficient. The authors Warschauer and Healey (1998) argue that the use of technology in language learning increases learners' autonomy and, as a result, students are more willing to take charge of their own progress.

Moreover, the use of technology in writing has enabled ESL learners to produce, edit, and publish their work on platforms that provide immediate language support. The use of online dictionaries, grammar checkers, and writing platforms like Google Docs are making students more confident and fluent in writing. Besides, teachers use technology as a valuable tool to conduct assessments, provide feedback, and plan lessons through digital platforms.

Challenges of Technology Integration in Primary Schools

While digital education has gained more and more importance, the question of how to integrate technology in primary schools, especially in public ones, remains a complicated issue. Among the factors that prevent the equal deployment of digital learning environments are limited infrastructure, outdated devices, unstable internet connections, and a lack of funding (Hew & Brush, 2007). In Costa Rica, though the Ministry of Public Education (MEP) has contributed significantly to the use of technology in classrooms through various initiatives, the availability of digital resources is still quite uneven. Schools in rural or marginalized areas have a hard time obtaining modern educational tools, which widens the digital divide and negatively affects language teaching and student engagement.

A further problem is the absence of a well-designed educational technology curriculum for teachers. Many teachers, particularly those in public primary schools, have little knowledge of how to use technology in their teaching. Suppose teachers do not receive proper training and continuous support. In that case, it will be impossible for them to select appropriate digital resources confidently, integrate them effectively into the curriculum, or resolve technical issues. Educators' lack of confidence may result in a very low level of use of tools; thus, language development and writing skills, among others, may not be enhanced if teachers do not use AI writing platforms sufficiently.

Besides that, integrating technology into the classroom adds another layer of accountability for teachers, who are responsible not only for content delivery but also for guiding students in the effective use of technology. For younger learners, this statement is especially true, as they may be digitally immature and thus cannot use tools independently or responsibly. Teachers have to invest time in demonstrating how to use digital tools, observing students' online behavior, and addressing misuse cases while adhering to curriculum standards.

MEP has implemented various strategies to develop digital skills and master 21st-century competencies in the Costa Rican context. Nevertheless, these policies often face challenges of resource scarcity and logistical constraints when implemented (MEP, 2016). Usually, classrooms are not equipped with the necessary digital facilities such as stable Wi-Fi, up-to-date computers, or interactive whiteboards. The motivation and training of teachers notwithstanding, they are still limited by poor technological support if they want to carry out their plans into practice.

The purpose of using technology in language learning can only be achieved if it does not distract or create further inequality stemming from systemic barriers that educational stakeholders must remove. Addressing these requires investment in infrastructure, targeted professional development, and policies that ensure continuous, equitable access to educational technologies in every learning environment.

Digital Literacy in Primary Education

Digital literacy is one of the basic things that should be included in the 21st-century education system. Particularly, it means, in the primary school system, the acquisition of skills —

and, by extension, attitudes— that enable children to use digital technologies, navigate digital environments, interact with online content, and use technological tools responsibly and effectively (Ng, 2012). Illiteracy in digital technologies is no longer just an obstacle in the background of education; it has put digitally illiterate students at risk of missing out on opportunities to participate in learning in the modern world, especially in a world dominated by AI, virtual platforms, and online resources.

The term “digital natives” (Prensky, 2001), often used to refer to students of this era, may not be very accurate. Children may entertain themselves with technologies such as games or social media apps, and show that they are easy to use, but this does not mean they know how to use digital tools for learning. Fundamental digital literacy includes the abilities of a person to look for information, assess the credibility of online sources, understand the meaning of digital feedback, and use tools for academic work, and all of these have to be taught explicitly and recapitulated regularly (Rheingold, 2012).

In language learning, the importance of digital literacy is particularly evident when students use AI tools such as Grammarly, ChatGPT, or Google Docs’ Smart Compose. These tools can detect and fix grammatical, vocabulary, and organization of the idea mistakes, and also provide users with recommendations in these areas. However, in the absence of basic digital literacy, students may misuse these tools, either by accepting suggestions without understanding them and thereby learning nothing, or by overusing automation, which weakens their language skills. Teaching digital literacy helps learners view AI as a helpful tool rather than a thinking substitute or a way of expression.

Educational policies in Costa Rica have recognized the importance of digital literacy as a pre-requisite for the effective use of Information and Communication Technologies (ICTs) in the classroom. The public education ministry has launched various programs to equip students and teachers with digital skills. However, there are still a few walls standing in the way. Many teachers say they do not have enough time and have not received sufficient training or resources to thoroughly plan and implement digital literacy lessons in their classes (UNESCO, 2022). This statement is more applicable to areas less blessed with resources, as in these kinds of schools, the primary focus is still meeting the most basic curriculum requirements.

Moreover, digital literacy means good online behavior and, even better, prepares one for ethical behavior and for being a responsible participant in the online community. Learners should be taught not only the skills of copyright respect, if they are to circumvent the laws, but they should be made aware that even if they are using the ideas of others, passing them off as their own is wrong, that their security depends on them, and that they should always try to be friendly and polite when they talk digitally. These rights and rules are fundamental, for example, when using AI, because, when abused, one can cheat in their academic work or become overly dependent on external platforms while internalizing little.

Digital literacy promotion is a strong support for educational fairness. The setting of all students, no matter their economic status, to use technology in a meaningful way will be the teachers' most significant contribution to leveling the playing field for students. It will also provide tools that serve as gateways to knowledge, creativity, and successive academic achievements (Selwyn, 2016). For schools, digitally integrating literacy into daily teaching is not only a must for the proper use of AI in writing but also for preparing students to perform successfully in a digitally connected world.

Equity and Accessibility of AI in Public Education

The use of Artificial Intelligence (AI) technologies in the education sector has brought a plethora of opportunities that could eventually lead to improved learning through different methods, such as writing. Nevertheless, these innovations have also sparked concerns about fairness and access, especially in public primary schools. Putting it this way: the big question that accompanies the increasing popularity of AI in educational systems is how to make sure that, without any condition, students who come from lower classes, areas far from the cities, and less equipped schools, can still tap into the riches of Artificial Intelligence.

Access to AI technology alone does not guarantee equitable use of AI. It involves the conditions under which students can engage with AI tools more deeply and distinguish when they are being used, thus receiving an education that is not only very trendy but also efficient. Besides that, getting help from teachers who are industry-friendly and well-informed about integrating technology might be a critical part of the support system for members of the learning

community. Pedagogical equity of this nature necessitates material provision, digital literacy, and culturally sensitive AI-friendly learning practices.

Technological Initiatives taken by public education systems in Costa Rica and other similar countries have, to a large extent, been successful. However, the quality of AI access varies widely from one place to another. Children in city schools are enjoying the opportunities offered by modern gadgets, a fast and steady internet connection, and exposure to the latest trends. On the other hand, students in remote areas or deprived schools have to put up with outdated equipment, a lack of technical support, and little or no training in using AI to improve learning. Therefore, AI is at risk of becoming an instrument that exacerbates rather than reduces educational disparities, as stated by Warschauer & Matuchniak (2010).

Additionally, the issue of fairness in accessing AI tools extends to the front of their creation. Most AI-powered writing tools, such as ChatGPT or Quillbot, are developed in settings with linguistic standards and cultural features that differ significantly from those of learners in Costa Rica or other non-English-speaking countries. For example, AI writing suggestions might disregard regional English variants or even reinforce norms that contradict local teaching objectives. Consequently, if users are unaware of the customization feature or are not knowledgeable about the situation, they will receive feedback from these tools that is linguistically biased and culturally irrelevant, which ultimately results in confused students or even lowered motivation levels (Livingstone, 2012).

One more equity issue related to the risk of over-reliance on empathy among under-supported students. Those students who do not have good basic skills and qualitative teacher guidance might wrongly incorporate the use of AI-supposed feedback; that is to say, in an incomprehending way, they accept it without understanding, inappropriately execute it, or in such a manner as to effectively skip the process of writing with the use of AI. Thus, AI, in that case, becomes a means of saving time rather than a support system. This situation creates a problem for students attending schools where they are already at a disadvantage due to a shortage of one-to-one instruction.

Implementing fair access and proper use of AI devices should be the outcome of a series of educational reforms. First, the integration of AI into teaching calls for a set of newly defined teacher-training ethics, an understanding of different cultures, and an emphasis on student

independence. Secondly, partnerships with edtech companies can be instrumental in localizing AI implementation by making it more compatible with region-specific requirements, thereby enabling it to serve as a tool of empowerment rather than a source of discomfort for learners in a particular geographical setting. Thirdly, educational leaders need to make equity the starting point when devising national digital education policies; in addition to promoting infrastructure development, they should also address issues such as curriculum design, professional development, and evaluation frameworks.

In general terms, fairness in the implementation of AI as an educational tool is about more than equal provision of a gadget; it is about the power every student should have to use AI in the proper manner, thinking critically and ethically. Simply put, improvements in rural areas' infrastructure, teacher development, and ensuring that each student, regardless of background, can fully engage with the benefits of AI-enhanced writing instruction are what the equity cause stands for. Without equity, the great potential AI holds for education will be limited to a utopia.

Concept of Artificial Intelligence (AI)

Artificial Intelligence (AI) is about developing computer systems that can do things which usually need human intelligence, such as understanding language, learning from experience, and making decisions. AI is turning out to be a very powerful and mainly influential tool in education as it has an ability to change the learning activities in a way that fit the individual student's needs by offering personalized support which normally would be very hard to deliver in a large classroom (Luckin et al., 2016). Artificial Intelligence (AI) refers to the development of computer systems that simulate human cognitive processes such as learning, reasoning, problem-solving, and decision-making. In recent years, AI has gained significant attention in education as a transformative tool capable of personalizing learning, improving administrative efficiency, and providing real-time feedback to learners.

AI devices can provide ESL students with immediate grammatical and vocabulary correction, thus making them competent in grammar and vocabulary practice outside the classroom. The devices stimulate communication and lead the learners step-by-step, thereby enabling learners to become more confident and independent. Though, the human factor in

education is still indispensable, as teachers are the ones who can deliver cultural context, give energy, and develop critical thinking which AI cannot substitute.

“We should not overlook the ethical side of issues such as data confidentiality and the possibility that AI systems may mirror the biases in the data they are trained on” (Selwyn, 2019). Teachers’ ought to be in a position to utilize AI in a proper manner; they should therefore direct students to comprehend and critically evaluate the feedback they get. In sum, when considering the potential of AI to be harnessed alongside L2 pedagogy, it can be a very powerful language learning enhancer.

Artificial Intelligence in Education

Personalized learning is one of the most promising applications of AI in education. AI systems process vast amounts of data left by students during the learning process, such as quiz results, time spent on a task, or patterns of mistakes. By using this data, AI can identify learners' strengths and weaknesses and personalize teaching by adjusting the content level, suggesting new resources, or changing the style of feedback (Woolf, 2010). The power to tailor learning journeys is significant in mixed-ability classrooms, where learners differ in skills and learning styles.

Moreover, AI-supported systems like Intelligent Tutoring Systems (ITS) offer a broad range of subjects, from arithmetic to language arts, with interactive, gradual instruction. ITS can impersonate the role of a personal tutor by continually adapting its actions to the learner’s input, thereby providing the necessary help, clarification, and support when the student is stuck (VanLehn, 2011). Such immediate help keeps students motivated and fosters a deeper understanding of the subject matter, something that is scarce in traditional classes with large numbers of students per teacher.

AI has additionally led to improvements in assessment and feedback mechanisms. Conventional assessment methods have inefficiencies such as delayed grading and evaluators’ subjectivity. AI can fully automate the assessment of student work, even for complex tasks like essays, by checking grammar, coherence, and content relevance (Balfour, 2013). Corrective comments in real time will allow students who need to update their work to practice iterative

learning and steadily improve their skills. Besides, AI tools provide teachers with comprehensive insights into pupils' progress, making it easier for them to intervene at the right time and make more well-informed teaching decisions.

Nevertheless, embedding AI into educational scenarios is not without its share of substantial barriers, in addition to these benefits. Among other issues, ethics is the focal point for data privacy, algorithmic bias, and transparency—issues that need to be tackled rigorously. AI systems heavily rely on learner data, raising questions about how such data will be collected, stored, and used (Holmes, Bialik, & Fadel, 2019). Besides that, many AI algorithms inherit biases from their training data, which can, in turn, impose unnecessary obstacles—for instance, unintentionally overburdening the demographic groups most represented in the dataset if the process is not carefully and continuously evaluated. Additionally, extensive use of AI may lead students to develop weaker critical thinking and creative skills, as they would depend heavily on automatic suggestions, thereby increasing the risk of being less resistant to skills-enabling technologies (Selwyn, 2019).

The educators' role in the AI-empowered classroom remains vital. Not only the operation of AI tools but also the critical interpretation of AI feedback and its integration in teaching methods are what teachers should be trained for. AI should be perceived as a helper performing the tasks teachers delegate to it, thereby increasing the teacher's potential rather than a rival taking over (Zawacki-Richter et al., 2019). Proper implementation of AI necessitates a well-designed system with support that includes, amongst other things, professional development, infrastructure development, and curriculum reorganization to harness AI's full potential.

To summarize, AI can transform the entire education system, making it more personalized, effective, and, on top of that, accessible. What matters most, however, is the way it will be implemented ethically, thoughtful, and well-balanced with pedagogical and equity considerations. The future of research and practice in education should aim to create AI tools that are not only clear and accessible but also facilitative and that meet the needs of learners and teachers across diverse contexts.

Artificial Intelligence Tools

Artificial Intelligence (AI) tools are becoming increasingly instrumental in the writing development process, especially for ESL learners. These innovations employ complex language processing to analyze students' writings and, consequently, present improvements in grammar, vocabulary, and sentence structure as their suggestions. To illustrate, grammar correction tools point to common errors and suggest corrections that not only improve the learner's writing but also make it more communicative and transparent. At the same time, paraphrasing tools help students convey their ideas in different ways, thus encouraging the use of writing as a means of communication and reducing word repetition in their texts.

Moreover, writing-supporting conversational AI, like interactive chatbots, can be helpful in the writing process by generating ideas, responding to questions, and providing guidance on organizing the writing. Such immediacy and personalization of the help given to them enable students to be more creatively involved in writing, self-edit their drafts, and grow in language self-confidence.

Besides correction, Artificial Intelligence-powered tooling supports learners, thus adjusting the help given to individual learners according to their needs. The said personalization entails that students with varying proficiency levels will still be on the receiving end of targeted feedback, which, in return, closes the gap that is in the limited teacher time and large class size-induced partially addressed classroom scenarios (Chen, Zhang, & Li, 2021).

The implementation of AI in writing pedagogy yields results when it works in harmony with a teacher's effort, who, on his part, not only guides but also empowers students to work on their own, while retaining the benefits of human interaction. Through the productive combination of technological support and well-thought-out pedagogical approaches, teacher-educators become proficient in ESL learners' writing instruction and teaching, resulting in a win-win for both parties (Kohnke & Moorhouse, 2022).

Feedback and Correction.

Perhaps the most valuable features of AI writing tools are their capacity to provide by far the most detailed and immediate feedback. While students are writing, they receive suggestions

on grammar, punctuation, word choice, and sentence structure, enabling them to identify and correct their errors in real time (Bitchener & Ferris, 2012). Such feedback is highly beneficial in large classes where teachers may not be able to give each student personalized comments.

Because AI feedback is automated, students can work on multiple drafts of their texts without waiting for the teacher's input. This, in turn, fosters active learning and students' engagement in developing their editing and revision skills. Moreover, the instant exposure to corrections serves as a strong reinforcement of grammar rules and writing conventions; therefore, language accuracy improves gradually.

Personalization and Adaptivity.

AI-powered tools can customize educational methods based on students' performance and preferences. In cases where a student regularly finds subject-verb agreement difficult, the tool can provide focused practice and explanations in that area. Adaptive systems track users' behavior and adjust the level of difficulty to keep users in an optimal learning zone (VanLehn, 2011).

The personalized method attracts engagement and allows students to move at their own pace. Besides, it is a good tool for differentiated instruction in mixed-ability classrooms, where all students receive the support they need. Personalization is a great way to promote learner autonomy because students gain greater control over their learning process and can dive into the language to the extent that suits their needs.

Limitations and Ethical Concerns.

Despite their benefits, AI writing tools have significant limitations and ethical issues that educators and developers need to be very careful about. A significant problem with the machine is that automated corrections are so prevalent that students may lose the ability to think critically and solve problems independently. Instead of becoming passive recipients of suggestions, students should be active writers who not only correct their mistakes but also understand the principles behind them. The latter risks leading to surface-level language skills without obtaining deeper language competence.

From an ethical perspective, the use of AI in education raises significant issues regarding data privacy, algorithmic bias, and transparency. To work correctly, AI systems need access to student data, which must be managed with strict security to prevent misuse or breaches. Besides that, algorithms can unintentionally stereotype or marginalize if they are poorly constructed and not frequently checked (Selwyn, 2019). The "black box" characteristic of many AI tools—when users cannot easily understand how a decision or suggestion is made—requires greater transparency and, thus, accountability in return.

Educators need proper training to critically evaluate AI tools, understand their pros and cons, and use them appropriately in their pedagogical practice. AI should be used as a tool in teachers' hands, not substituted for them. Human intervention is still needed to ensure that this new technology does not compromise ethical principles and educational quality. The promise of AI as a writing tutor can be realized without any drawbacks to student growth or their rights if technological innovation is balanced with ethical responsibility.

Teacher's Role in AI-Integrated Classrooms

In situations where artificial intelligence (AI) tools are used in classrooms, teachers' jobs become additionally important. AI, instead of replacing educators, changes the teaching interaction, allowing teachers to take on other roles, such as facilitators, mentors, and decision-makers. It is the teachers who must help students use AI tools effectively, and at the same time ensure that technology does not dominate the learning objectives but is a tool to support them. For instance, though grammar checkers and writing assistants may be helpful to students in terms of accuracy and fluency, it is the teacher who is indispensable in helping students grasp the rationale for a given correction and its relation to general writing rules.

Besides that, teachers should thoroughly make up their minds about which AI tools align with the curriculum goals and the students' (particularly primary students') developmental needs. They become significant in the process of digital literacy by teaching learners to analyze, challenge, and reflect on the suggestions from AI systems. This stops students from letting feedback pass them by and, at the same time, promotes metacognitive skills.

In such an environment, the teacher is also a link between human values and AI. AI ethical usage in schools is subject to teacher control. This is the only way to ensure the proper use of AI tools, data privacy, and inclusion. Educators also need continuous professional development to be aware of AI educational applications and integration possibilities, as well as to be knowledgeable about AI systems' limitations, as Holmes, Bialik, and Fadel (2019) stated.

Pedagogical Implications of Using AI in Primary ESL Writing

One of the most significant changes in the pedagogy of primary-level ESL classrooms is the incorporation of AI. ESL students can now be provided with writing prompts, grammar corrected, and real-time suggestions made by the AI, since traditionally writing instruction was only a teacher-led process. To a great extent, these tools can open up writing to youthful learners, especially to those who lack self-confidence or are not accurate, and can also make it more engaging.

On the writing instruction subject, which is the AI's primary application, the use of AI in pedagogy requires very careful consideration so that the feedback remains technology-driven while the teaching is human-centered. The teachers need to change their methods so that the implementation of AI would not interfere with pupils getting support from the teacher, interaction with peers, and the use of process writing strategies, but instead be a kind of support. For example, even if AI may assist students in revising their work quickly, it is the teacher who, by asking questions, can help them consider the structure, clarity, and audience context.

Moreover, the concern over assessment is raised by AI integration. Teachers need to figure out how to judge the quality of AI-assisted writing. Instead of simply considering the final product, educators can place greater weight on the process by which students work with AI-generated feedback to improve their writing. The change aligns with the principles of formative assessment and is a good way to build learner autonomy.

The AI technology is lucky to be able to provide such practice to young learners, especially in large classes like those in Costa Rica's public schools, where teacher feedback is limited. Nevertheless, successful deployment still requires that pedagogical practices be student-centered and suitably structured for the age group.

Gamification and Motivation in ESL Writing

Motivation is a significant factor that affects language learning, including writing skills. Young learners, especially in elementary school, need to be consistently engaged and uplifted to develop fluency, confidence, and perseverance. Recently, gamification, the use of game elements in non-game contexts, has been recognized as an effective way to increase learner motivation and participation in educational settings, such as ESL writing instruction (Deterding et al., 2011), and has become increasingly popular.

Gamification is the inclusion of game-like elements in the learning process, such as points, levels, badges, challenges, leaderboards, and rewards. The purpose of such elements is to pique the learner's interest, encourage self-regulation through goal-setting, and foster a sense of success. Gamification, if it is there in the writing instruction in a non-intrusive manner, has the power to change the challenging or tedious task of writing into an enjoyable and meaningful experience. This may be especially helpful for the children in grade five, as the visual and interactive nature of the gamified systems could stimulate them.

Almost all the writing-enhancing AI-supported tools, and several platforms, are, in a way, gamified or use game elements to promote learning. Grammarly offers users writing streaks, performance scores, weekly progress reports, and achievement badges, which help learners visualize their improvement over time. Also, Quillbot and ChatGPT encourage user-friendly, iterative revision and prompt completion through real-time feedback and a sense of progression, though not in a formally gamified way. All these features align with self-determination theory (Deci & Ryan, 2000), which holds that intrinsic motivation is reinforced when learners experience independence, competence, and connection, all of which can be fostered by gamified learning experiences.

On top of that, gamification aligns with the engagement theory of learning (Kearsley & Schneiderman, 1998), which advocates meaningful learner engagement through collaborative, project-based, and technology-enhanced activities. When learners receive rewards for completing writing, achieving new milestones, or correcting previous mistakes, they are more likely to engage in the writing process. This can result in a higher time-on-task, a greater willingness to revise, and more positive attitudes towards writing in English.

In schools, for example, Escuela Carlos Sanabria Mora, gamified AI tools can help students overcome emotional barriers, such as writing anxiety or low self-esteem, that often accompany primary school-age students. By framing writing as a challenge or a game rather than a test of ability, students may take the task with greater eagerness and stamina. Besides, gamification can create immediate feedback loops that support learning in the moment, which is rarely achievable in traditional classrooms due to limited teacher time. However, the employment of gamification should be balanced and well-intentioned.

Nonstop emphasis on external motivators may cause students to lose interest in the task if they become overly dependent on points, failing to appreciate the writing process itself (Nicholson, 2015). So it is very important that the gamified tools include reflection activities, goal setting, and teacher guidance to ensure that the primary focus of the learning is maintained.

Overview of AI Writing Tools (e.g., ChatGPT, Grammarly, Quillbot)

AI writing tools have become popular with learners, educators, and professionals who want to enhance their writing skills. One such example is Grammarly, which offers immediate feedback on grammar, spelling, and style. Besides, it determines the text's tone and explains the changes it suggests. Hence, the users are not only fixing errors but also learning how to polish their writing. Quillbot, conversely, is a paraphrasing tool; in this way, the user can reword sentences to make the text more understandable, consistent, and less similar to the source (in the case of a research paper). By the same token, ChatGPT is a conversational agent created by OpenAI that can generate the most relevant and contextually coherent text as per the user's request; thus, it is an effective tool for idea generation, writing the first draft, and even polishing ideas.

These instruments operate using sizable linguistic models trained on massive datasets, which in turn enable them to speak like humans and recognize complex language structures. These services are available to users through a web browser or a phone app, which, in addition to the above services, may also include writing templates, vocabulary suggestions, or even translation features. The ease of use, coupled with very prompt feedback, is the main attraction of these techniques for classroom use as well as for self-directed learning.

However, the efficacy of AI writing tools depends on how learners use them. If employed thoughtfully, they can help the writing process flow more smoothly, provide learner-specific assistance, and foster the habit of revising one's work. On the other hand, if there is a lack of critical engagement, users may become dependent on the tools, which will, in turn, hinder their acquisition of language skills. Therefore, the use of AI tools in conjunction with teacher support ensures a well-balanced approach that provides maximum educational benefit (Chen, Zhang, & Li, 2021; OpenAI, 2023).

How AI Supports Writing: Vocabulary, Grammar, Sentence Structure

Artificial Intelligence (AI) tools provide extensive support that opens up writing development at both micro and macro levels. At the micro-level, AI assists learners in broadening their vocabulary by recommending synonyms and more accurate word choices, which can be very helpful for ESL students with limited lexical variety. Such prompt help extends language use and helps students grasp subtle meanings, thereby making their writing not only richer but also more accurate. Moreover, AI-based grammar correction tools pinpoint errors such as incorrect tenses, subject-verb disagreements, and punctuation errors, and thus correct students and provide guidance for forming clearer, grammatically correct sentences. The feedback students get from their mistakes gradually makes them proficient as they are encouraged to take note of their errors and develop proper usage patterns deeply rooted in their memory. At a macro level, AI aids in organizing ideas and overall text cohesion. The students receive help from features such as outlining assistance, topic-sentence suggestions, and paragraph-transition feedback to logically and cohesively structure their writing.

These programs facilitate the transition, which is very difficult for language learners, from disconnected sentences to well-linked paragraphs. By presenting correct writing structures and providing tailored, flexible feedback, AI systems help students improve their writing skills and the soundness and clarity of their compositions. To emphasize, though, AI offers automated, instant feedback, which greatly enhances writing efficiency and learner autonomy. The most effective use of AI is when teachers facilitate it. Educators assist learners in critically assessing

AI-generated suggestions while maintaining their writing style's authenticity. Hence, AI can be used as a vocabulary-supporting, grammatical-accuracy-enhancing, and structure-coherence-promoting tool that not only improves the quality of students' writing but also increases their confidence in the process (Yin & Wang, 2022; Kumar & Boulanger, 2021).

Student Engagement and Autonomy Through AI

Implementing artificial intelligence (AI) in writing instruction can significantly lead to student engagement and learner autonomy, especially with children. Such instruments provide students with an environment to learn, where they receive almost instant feedback on their writing, enabling them to correct their mistakes at once. This is very exhilarating because of the fast, visible progress students can follow, and they feel they are taking another step towards their goals. For instance, in the case of young ESL learners, such positive reinforcement is of prime importance for building their writing confidence in the second language and, at the same time, easing their anxiety. Various AI-based tools, to name a few, such as Quillbot and ChatGPT, are mainly designed to motivate the learner to continue the task and, by extension, help the user maintain their initiative and concentration. Among the options available, words suggested by the program, writing prompts, and grammar explanations make the writing process inherently more interactive and exploratory. Instead of doing the writing task only once, kids understand that writing is a constant interaction with the text, as they can always come up with improvements at any time. This particular concept of a growth mindset is a breakthrough, where mistakes are recognized as opportunities for further development, not as downsides of the work.

Moreover, these instruments not only help students become more independent but also allow them to learn at their own pace. Wherefore, given the large class sizes that may hamper teachers' ability to give each student individual feedback, the latter role could be alleviated by the presence of AI, due to its constant, instantaneous nature and its tailored character. The learners are free to decide which feedback to incorporate, look into the explanations more, and get a revision done without any fear of being singled out. Self-engagement through such a medium significantly contributes to learning ownership and supports the development of key skills such as decision-making, critical thinking, and taking responsibility for one's progress. One more significant point is that students can use AI tools to frequently revisit their previous writing

assignments, compare versions, and identify recurring errors. Such a cyclical engagement in writing raises metacognitive awareness, leading learners to be more reflective about their language use and to make better conscious choices in their upcoming writing tasks. If the use of AI in writing becomes a regular habit, many benefits will be realized in areas such as revision and self-assessment, which are fundamental to writing proficiency.

At the same time, fully utilizing the potential of AI for engagement and learner autonomy is not possible without a judicious pedagogical framework into which AI is incorporated. The teachers should guide and control how students use the devices so that pupils understand the feedback they receive and use it not only to correct their errors but also to deepen their grammar knowledge. Kumar and Boulanger (2021), in their article, explain that the maximum efficiency of AI could be extracted when it is seen as a mixed method of instruction that encompasses technological partnership with human teaching and reflection.

The concluding part of this topic states that, in fact, AI devices should not be viewed as mere passive correctors but rather as partners in learning, which will foster enthusiasm and independence in learners' writing process. When used with the requisite thoughtfulness, AI tools enable young ESL learners to actively contribute to their writing progress, even in less-than-ideal educational situations.

Chapter III

Methodological Framework

Research Approach

This study adopts a mixed-methods research approach, integrating both quantitative and qualitative methodologies to offer a richer and more nuanced understanding of the impact of Artificial Intelligence (AI) tools on the development of writing skills in fifth-grade ESL students. A mixed-methods approach is particularly suitable when exploring educational phenomena, as it allows for triangulation of data and a more comprehensive interpretation of the results.

On the quantitative side, the study gathers data through pre- and post-intervention writing samples to measure observable improvements in students' writing performance. This includes assessing areas such as grammar accuracy, sentence structure, vocabulary use, and coherence. Quantitative data provides objective evidence of the extent to which AI tools influence writing development.

On the qualitative side, the study incorporates open-ended questionnaires, teacher interviews, and classroom observations to capture participants' perceptions, attitudes, and experiences with AI-assisted writing. This component helps to contextualize the numerical findings and offers insights into students' engagement, motivation, and learning behaviors.

By combining these two approaches, the study not only identifies whether changes occur but also explores why and how these changes take place, which is essential for informing classroom practice and future research.

Research Design

The research follows a descriptive design, which aims to systematically observe, record, and analyze the natural use of AI tools in an ESL writing classroom without manipulating any variables. This design is especially appropriate for studies in educational settings where the goal is to understand current practices, conditions, or phenomena rather than to establish cause-and-effect relationships.

In this study, the descriptive design focuses on documenting how students interact with AI writing tools such as Quillbot, and ChatGPT, and how these tools support their writing development over time. It also explores students' and teachers' perceptions regarding the usefulness, accessibility, and challenges of integrating AI in primary education.

The descriptive nature of the study allows for a detailed portrayal of the implementation process and its outcomes in a real-world classroom. Through this approach, the research identifies trends, recurring patterns, and key aspects of student performance and engagement that can inform decision-making for educators, curriculum developers, and policymakers.

Population and Sample

The population consists of 30 fifth-grade students (aged 10–11) from Escuela Carlos Sanabria Mora in Pavas, San José, Costa Rica. These students were chosen because they are currently engaged in learning English as a second language (ESL) and are at a stage in their academic development where writing skills are being actively introduced and reinforced.

The purposive nature of this sample selection is justified by the study's focus on evaluating the impact of Artificial Intelligence (AI) tools on writing development in young ESL learners. By selecting students who are in the same grade level, under the same curriculum, and taught by the same English teacher, the study ensures consistency in instruction and context. This allows for a clearer examination of how AI tools, such as ChatGPT or Quillbot, might influence writing outcomes in a real-world classroom environment.

The sample also includes the English teacher as a key informant. The teacher's observations, reflections, and participation in the AI integration process are important for understanding how technology supports or challenges existing teaching practices. Their insights contribute to the qualitative dimension of the study, particularly in interpreting student progress, engagement, and challenges during the intervention.

While the sample is limited in size, it is sufficiently representative for a small-scale, classroom-based investigation aimed at exploring practical implications and gathering preliminary evidence. The findings, though not generalizable to all primary schools in Costa Rica, may provide valuable insights and recommendations for similar educational contexts.

Data Collection Instruments

The data collection for this mixed-methods study utilizes a combination of quantitative and qualitative instruments to thoroughly examine the effects of AI tools on the writing skills of primary school students.

Students complete writing tasks both before and after the AI intervention, allowing for a quantitative assessment of progress. These writing samples are evaluated using a detailed rubric that measures key components such as vocabulary richness, grammatical accuracy, sentence structure, coherence, and overall clarity.

In parallel, classroom observations are conducted using a structured checklist designed to capture students' engagement levels, participation rates, and interactions with the AI writing tools during lessons. To understand the students' perspectives, a questionnaire with mostly closed-ended questions is used, designed to be simple and clear for children, capturing their motivation, ease of use, and perceived improvements.

Lastly, semi-structured interviews with the classroom teacher are conducted to gain deeper insight into the practical implications, instructional challenges, and observed changes in students' writing behaviors and attitudes. This multifaceted data collection approach ensures a comprehensive analysis of both the measurable outcomes and contextual factors influencing the effectiveness of AI-assisted writing instruction.

Sources

This research relies on both primary and secondary sources to investigate how artificial intelligence (AI) tools can support the development of writing skills among young ESL learners in a Costa Rican primary school context.

Primary sources consist of several types of data collected directly from the research participants and the classroom environment. These include writing samples produced by the twenty-nine students, aged 10 to 11, both before and after implementing AI tools, providing concrete evidence of any progress or changes in their writing abilities. Classroom observations are conducted systematically to record students' engagement, participation, and reactions while interacting with AI tools during writing tasks, offering qualitative insights into their learning

processes and behavioral responses. Furthermore, a structured questionnaire with closed-ended questions is administered to gather students' perceptions, attitudes, and levels of motivation related to using AI for writing practice, which ensures that the data are accessible and comprehensible for young learners. An additional layer of primary data comes from a semi-structured interview with the English teacher, who provides professional perspectives on classroom dynamics, teaching challenges, and observations regarding student performance and adaptation to technological tools.

Complementing these primary sources, the study draws extensively on secondary sources, including academic books, peer-reviewed journal articles, research reports, and official policy documents. Works such as Hyland (2003) on second language writing, Holmes et al. (2019) on AI applications in education, and Vygotsky's theories of learning contribute essential theoretical grounding, while the Costa Rican Ministry of Public Education's English curriculum (MEP, 2016) offers practical context and standards guiding language instruction in primary education. These secondary materials serve to frame the research within broader academic discourse, providing comparative insights and supporting the interpretation of findings. Together, the integration of both primary and secondary sources ensures a robust and multidimensional understanding of the ways in which AI tools may influence writing development among young ESL learners, allowing for a thorough exploration of both practical outcomes and theoretical implications.

Chapter IV

Data Analysis

This chapter presents and discusses the findings of the study on the use of Artificial Intelligence (AI) tools to enhance writing skills in fifth-grade ESL students at Escuela Carlos Sanabria Mora in Pavas, Costa Rica. The results are organized according to the data collected from writing samples, classroom observations, student questionnaires, and the teacher interview. Both quantitative and qualitative findings are reported in order to provide a comprehensive understanding of how AI-supported instruction influences young learners' writing performance, engagement, and autonomy.

The quantitative results focus on pre, during and post-intervention writing tasks, examining measurable improvements in areas such as grammar accuracy, sentence structure, vocabulary use, and coherence. These outcomes provide evidence of students' progress after using AI writing tools such as Quillbot, and ChatGPT.

The qualitative results complement these findings by capturing students' perspectives through a closed-question questionnaire, as well as insights gained from classroom observations and the teacher's interview. These sources highlight students' attitudes, levels of motivation, and behavioral responses while working with AI tools, as well as the teacher's professional reflections on the integration of technology in primary education.

By combining quantitative and qualitative perspectives, this chapter not only illustrates the impact of AI tools on the students' writing development but also explores the underlying factors that explain these changes.

Figure #1: Writing Pre-AI Intervention

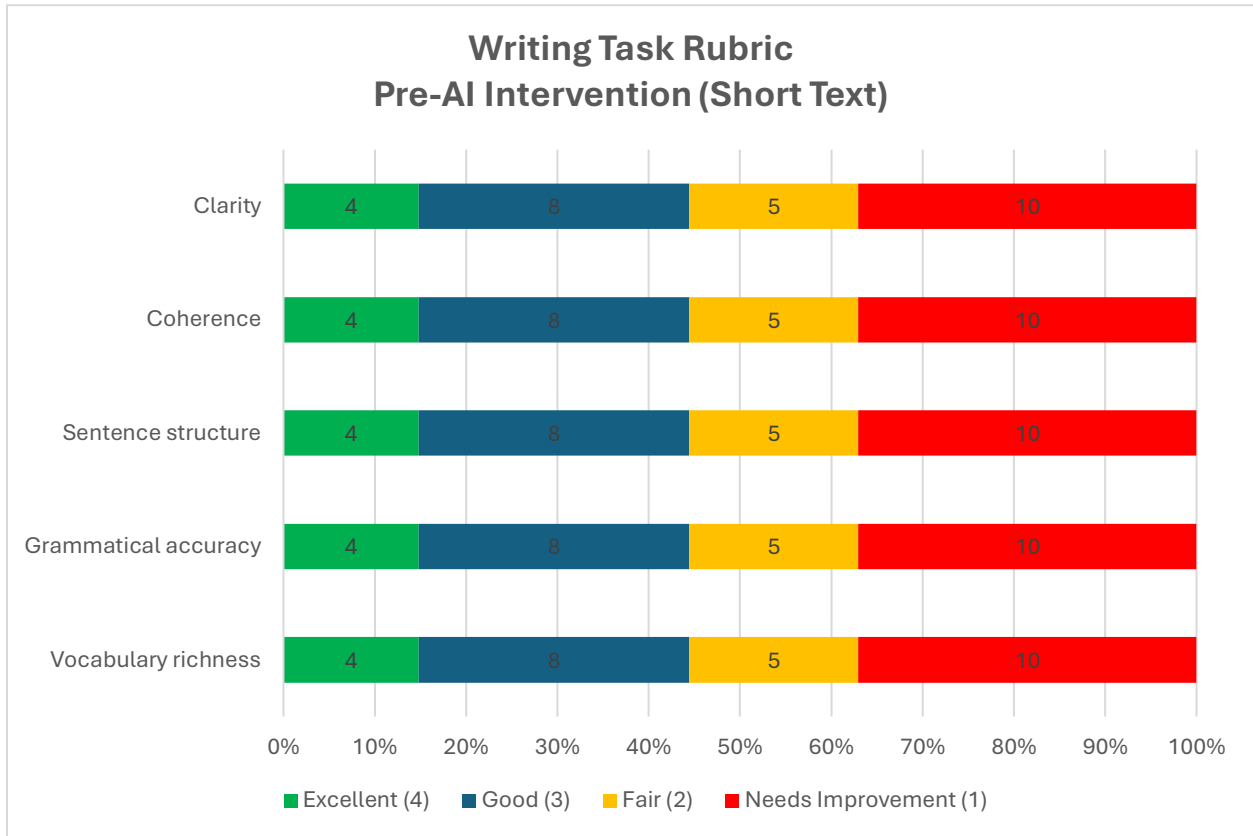


Figure 1 illustrates the results of the initial writing assessment conducted with 27 fifth-grade students (2 students were absent) at Escuela Carlos Sanabria Mora, prior to the implementation of AI tools. The researcher gave them a photocopy with a picture of a dog and another one of a small house with a nice garden and the students had to write a short description of each picture.

Each writing sample was evaluated with a rubric measuring five components: vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity. The rubric consisted of four performance levels: Excellent (4), Good (3), Fair (2), and Needs Improvement (1).

The data revealed that only 4 students achieved an Excellent rating across the evaluated categories, while 8 students were rated as Good. A total of 5 students fell into the Fair category, and 10 students were rated as Needs Improvement. These results indicate that more than half of

the participants demonstrated limited proficiency in essential writing skills, particularly in grammar, vocabulary, and sentence organization.

A qualitative analysis of the writing samples revealed several recurring errors that hindered students' ability to express ideas effectively. Common grammatical mistakes included incorrect verb conjugation, subject-verb agreement errors were frequent, vocabulary use was often basic and repetitive, indicating a limited lexical range. Additionally, many students produced fragmented or disconnected sentences, which demonstrated lack of cohesion and logical flow. The absence of connectors and transitional phrases further contributed to weak coherence and clarity.

Notably, some students exhibited phonetic spelling errors influenced by Spanish pronunciation. For example, phrases such as “Der is” were used in place of “There is,” and “Wi jaf” instead of “We have.” These errors suggest that learners are attempting to write based on how they hear and pronounce English words, reflecting a gap between oral comprehension and written accuracy. This phenomenon is common among early ESL learners and highlights the importance of explicit instruction in phonological awareness and spelling conventions.

Figure 1 provides essential baseline data that supports the first specific objective of this study. The results show that a significant number of students were rated as “Fair” or “Needs Improvement” in categories such as vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity. These findings highlight the specific linguistic and structural challenges that AI tools can address through personalized feedback and real-time correction.

In summary, the initial assessment provides critical insight into the students' writing abilities prior to the intervention. It highlights the pedagogical necessity of integrating AI tools to address persistent writing challenges and to support the development of more accurate, coherent, and confident written communication in English.

Figure #2: Writing Pre-AI Intervention

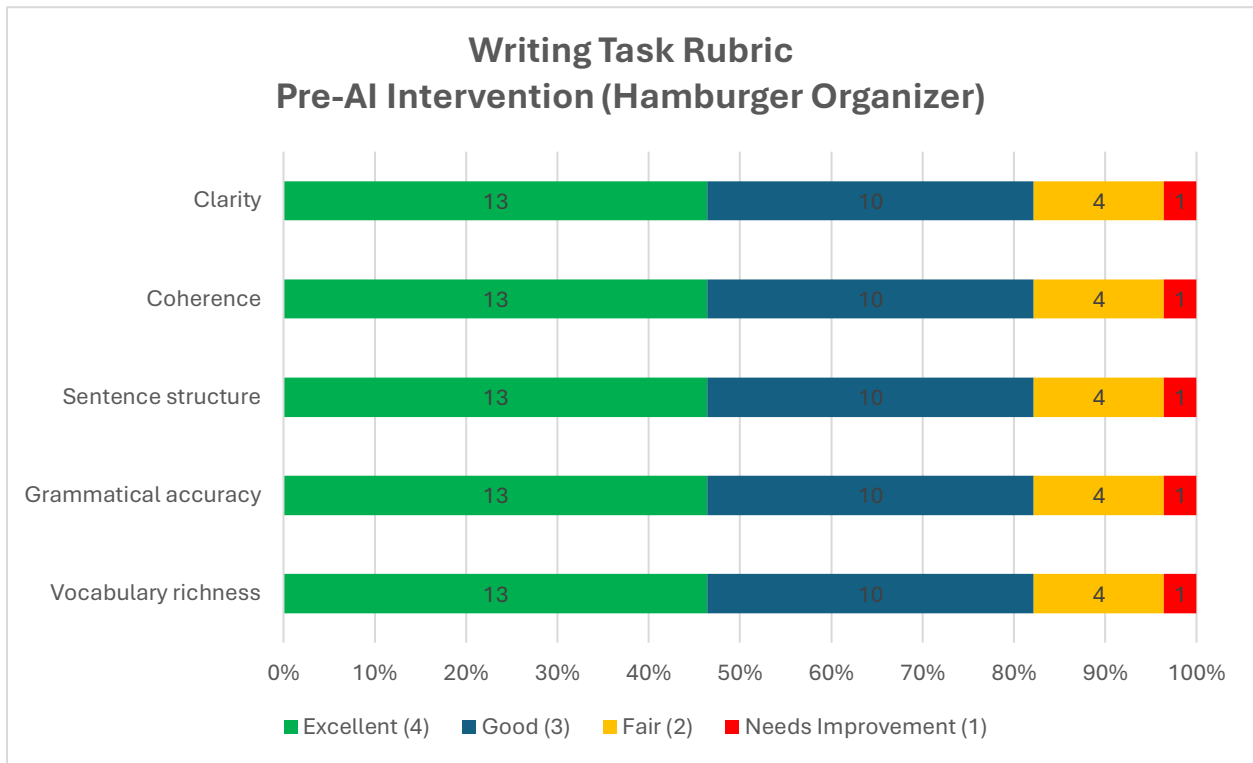


Figure 2 illustrates the results of other writing assessment conducted with 28 fifth-grade students (1 student was absent) at Escuela Carlos Sanabria Mora, prior to the implementation of AI tools. The writing task was based on the theme of electronic devices, aligned with the English class curriculum. To guide students, a “hamburger organizer” was provided by the researcher to help them structure their paragraphs with a topic sentence, supporting details, and a concluding sentence.

Each writing sample was evaluated with a rubric measuring five components: vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity. The rubric consisted of four performance levels: Excellent (4), Good (3), Fair (2), and Needs Improvement (1).

The data revealed that 13 students achieved an Excellent rating, 10 students were rated Good, 4 students fell into the Fair category, and 1 student was rated as Needs Improvement. These frequencies show that while a significant portion of students demonstrated strong

command of vocabulary, grammar, and organization, nearly one-third struggled with fundamental writing skills such as sentence construction, coherence, and accuracy.

This finding responds directly to Objective 1, which seeks to identify key elements of Artificial Intelligence as tools to support writing skill improvement. The categories where students performed poorly, particularly grammar, vocabulary, and sentence construction, indicate the specific areas in which AI tools can provide meaningful assistance.

The use of the rubric and the “hamburger organizer” during the pre-test connects with Objective 2, which focuses on implementing strategies that support the development of writing skills. While AI had not been introduced yet, these scaffolding techniques highlighted the kind of structured support students require, laying the groundwork for the upcoming integration of AI-based resources.

Finally, documenting the initial distribution of performance levels is directly tied to Objective 3, which involves evaluating the impact of AI-based activities on writing skill development in fifth graders. The pre-test serves as a baseline for comparison, ensuring that any progress observed after the intervention can be attributed to the use of AI tools.

These observations align with what Yin and Wang (2022) state about the benefits of immediate feedback in addressing recurring grammar and coherence problems. Furthermore, Kumar and Boulanger (2021) highlight that AI achieves its greatest effectiveness when integrated into a blended approach that combines technology with teacher guidance and student reflection. In this sense, the weaknesses identified in the pre-test reinforce the need for a complementary strategy where AI supports vocabulary expansion, grammatical accuracy, and structural coherence, while teacher scaffolding ensures that students internalize these improvements.

In summary, the pre-test results reveal both strengths and weaknesses in the students’ writing abilities. While several participants demonstrated advanced proficiency in vocabulary, grammar, and organization, a considerable group still struggled with fundamental aspects of written expression. These findings not only confirm the necessity of targeted support and immediate feedback but also establish a clear starting point for the subsequent intervention. This baseline will be essential for determining whether the integration of AI tools leads to measurable

improvements in writing performance, thus directly contributing to the overall purpose of the study.

Figure #3: Writing During AI Intervention

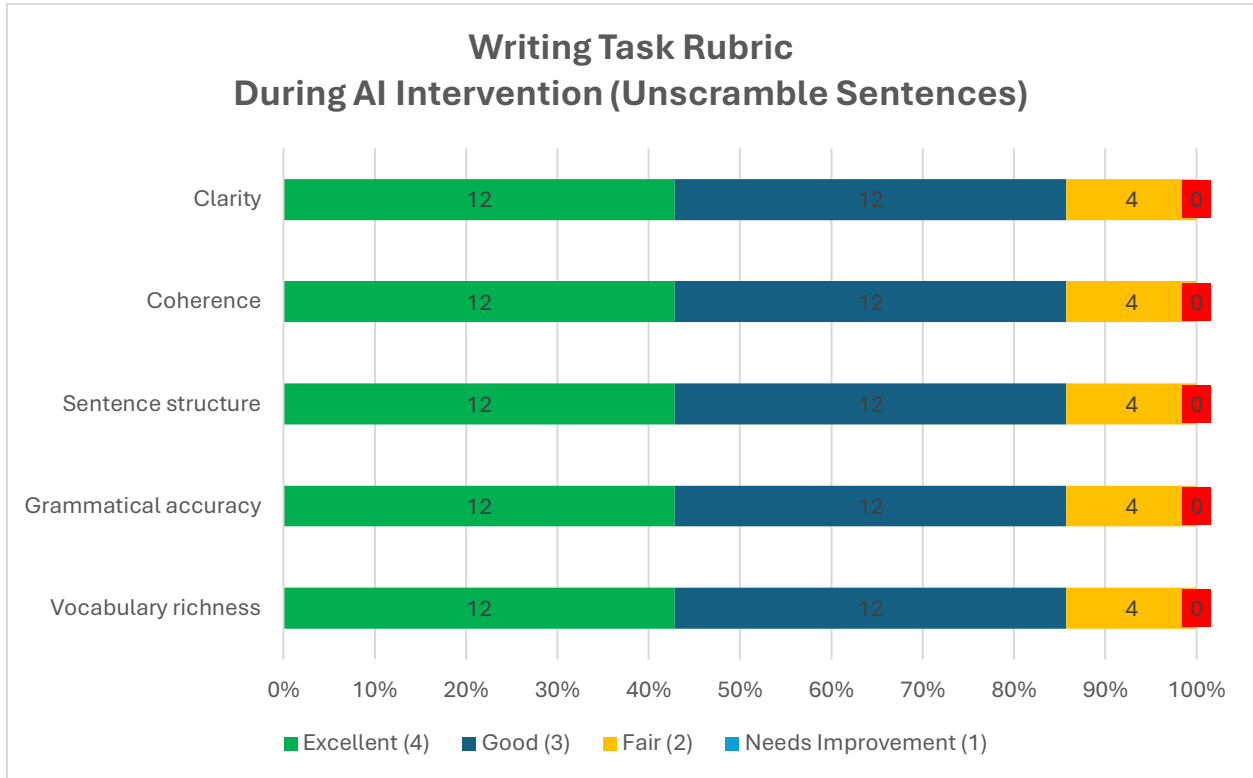


Figure 3 presents the results of the first writing activity conducted with 28 fifth-grade students (1 student was absent) at Escuela Carlos Sanabria Mora during the implementation of Artificial Intelligence (AI) tools. In this exercise, students were given two worksheets with sentence unscrambling tasks focused on the basic English sentence structure: subject + auxiliary verb + complement. The activity was supported by AI tools such as ChatGPT, and Quillbot, which provided real-time feedback and guidance.

The writing samples were evaluated using a rubric that assessed five key components: vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity. Each component was rated on a four-point scale: Excellent (4), Good (3), Fair (2), and Needs Improvement (1).

The data revealed that 12 students achieved an Excellent rating, 12 students were rated Good, 4 students fell into the Fair category, and no one were rated as Needs Improvement in any category. This graphic clearly demonstrates the positive impact of AI tools on students' writing performance. Compared to the pre-intervention results, there is a noticeable shift toward higher achievement levels, with no students falling into the lowest category.

During the first AI-supported writing activity, the researcher was granted access to the school's computer lab so that each student could work individually on a computer. The AI tool used for this session was Quillbot, a platform designed to assist with sentence structure, grammar, and vocabulary enhancement.

Before beginning the activity, the researcher provided a brief tutorial to the students, explaining how to use Quillbot effectively. Once students were familiar with the platform, they received printed worksheets containing sentence unscrambling tasks. Initially, students completed the exercises using their own knowledge of English. Afterward, they typed their answers into Quillbot, which automatically corrected grammatical and structural errors in real time.

Some common errors observed during the activity included are the following: for the sentence "is car green This", one student wrote "This is green car" instead of the correct "This car is green." For "small The is bird", a student wrote "The small is bird" instead of "The bird is small." And other one was for "slow turtle The is", the response "The is turtle slow" was given instead of "The turtle is slow." These examples illustrate typical challenges in word order and sentence structure that are common among ESL learners. The AI tool helped students recognize these issues and provided corrected versions, which they could analyze and learn from.

This process allowed students to compare their original responses with the AI-generated suggestions, helping them identify and understand their mistakes. The immediate feedback provided by Quillbot supported self-correction and reinforced language patterns.

Throughout the session, students showed a high level of interest and engagement. They remained focused and actively participated in the activity. Many students expressed enthusiasm, commenting to one another how enjoyable and fun it was to learn English using technology. This

positive response suggests that the integration of AI tools not only enhanced their writing performance but also increased motivation and confidence in using English.

The implementation of the AI-supported writing activity described in Figure 3 is aligned with the research objectives, as it allowed the researcher to identify key elements of Artificial Intelligence, specifically Quillbot, as effective tools to support writing skill improvement. By guiding students through the use of this platform and allowing them to compare their own answers with AI-generated corrections, the intervention fulfilled the second objective, which was to implement AI tools to support the development of writing skills. Furthermore, the results obtained from this activity, where no students were rated as “Needs Improvement” and the majority achieved “Good” or “Excellent” scores, provided concrete evidence to evaluate the impact of AI-based activities on students’ writing development, thus addressing the third objective. The students’ high level of engagement and enthusiasm also reinforced the motivational benefits of integrating AI into the ESL classroom, highlighting the pedagogical value of this approach.

In conclusion, the results presented in Figure 3 demonstrate the positive impact of integrating Artificial Intelligence tools, into the writing instruction of fifth-grade ESL students. The significant reduction in low-performance ratings and the overall improvement in grammar, sentence structure, and clarity suggest that AI-supported activities can effectively address common writing challenges. Moreover, the high levels of student engagement and enthusiasm observed during the activity highlight the motivational benefits of using technology in the classroom. These findings reinforce the potential of AI tools not only to enhance writing proficiency but also to foster a more dynamic and student-centered learning environment. This activity serves as a foundational step in validating the role of AI in primary education and supports the broader objectives of this research.

Figure #4: Writing During AI Intervention

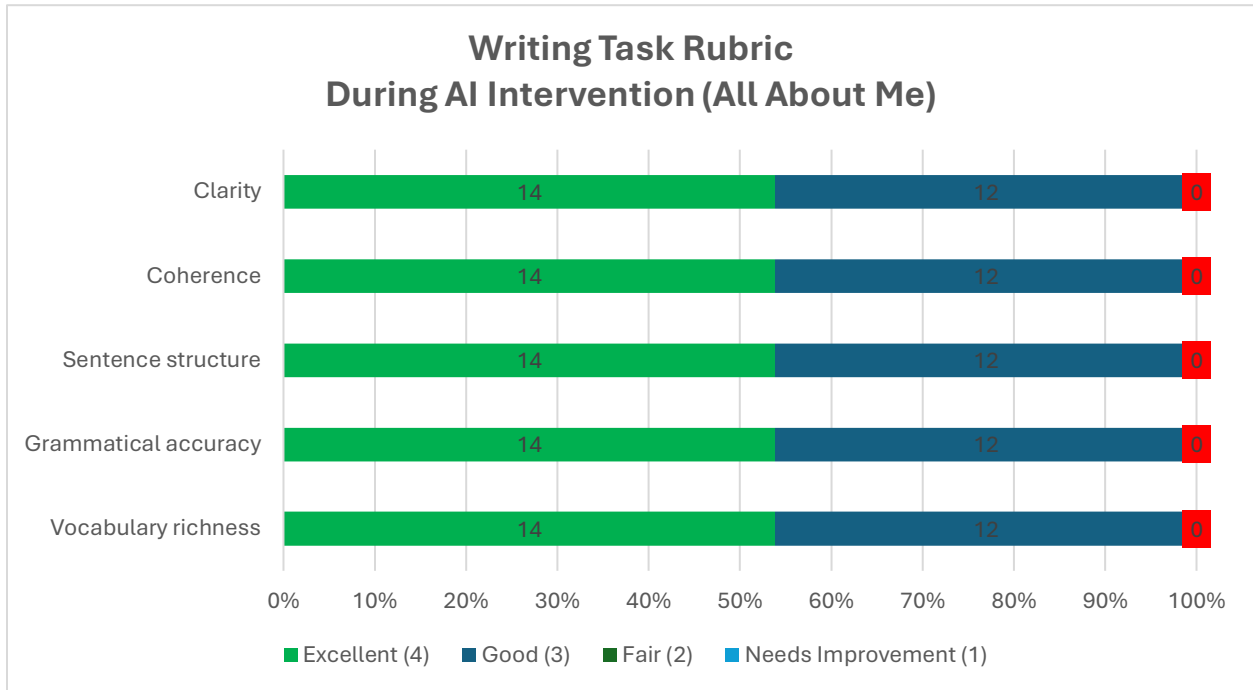


Figure 4 presents the results of the second writing activity conducted with 26 fifth-grade students (3 students were absent) at Escuela Carlos Sanabria Mora during the implementation of Artificial Intelligence (AI) tools. In this activity, the researcher provided students with a worksheet titled “All About Me”, designed to encourage the use of complete sentences in English to express personal information. Students were asked to write about their name, birthday, favorite music, favorite food or drink, favorite color, and other similar questions. These prompts aimed to help students practice basic sentence structures while using vocabulary relevant to their daily lives.

Importantly, students first completed the worksheet without any assistance from AI tools, relying solely on their current English knowledge. After writing their sentences, they entered them into an AI application such as ChatGPT or Quillbot to receive feedback and identify any grammatical or structural errors. Based on the AI suggestions, students then rewrote the corrected sentences on a separate sheet, allowing them to compare their original writing with the improved version.

This process helped students reflect on their mistakes, understand the corrections, and reinforce proper sentence construction. The activity not only supported writing development but also promoted learner autonomy and engagement through the use of technology.

The writing samples were evaluated using a rubric that assessed five key components: vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity. Each component was rated on a four-point scale: Excellent (4), Good (3), Fair (2), and Needs Improvement (1). The results showed that 14 students achieved an Excellent rating across all categories, while 12 students were rated as Good. Notably, no students were rated as Fair or Needs Improvement in any of the evaluated components.

The writing activity presented in Figure 4 directly supports the fulfillment of the specific objectives outlined in this research. The first specific objective, which aimed to identify key elements of Artificial Intelligence tools that support writing skill improvement, was addressed through the use of platforms such as ChatGPT and Quillbot. These tools provided students with immediate feedback on grammar, vocabulary, and sentence structure, allowing them to recognize and correct their errors. The second specific objective, focused on implementing AI tools to support the development of writing skills, was achieved by guiding students through a structured process: first writing independently, then using AI to revise their work, and finally rewriting corrected versions. This sequence promoted active learning and self-correction. The third specific objective, which involved evaluating the impact of AI-based activities on writing development, was fulfilled through the analysis of the students' performance. The results showed that all participants achieved either "Excellent" or "Good" ratings across all writing components, with no students falling into the "Fair" or "Needs Improvement" categories.

These findings demonstrate a significant improvement in students' writing performance compared to the pre-intervention assessments. The absence of low ratings suggests that the use of AI tools enabled students to identify and correct common errors, resulting in more accurate, coherent, and confident written expression. Furthermore, the activity promoted learner autonomy and engagement, as students actively participated in the revision process and reflected on their mistakes. This outcome supports the effectiveness of AI-assisted writing instruction in enhancing ESL writing skills among primary school learners.

Figure #5: Writing Post AI Intervention

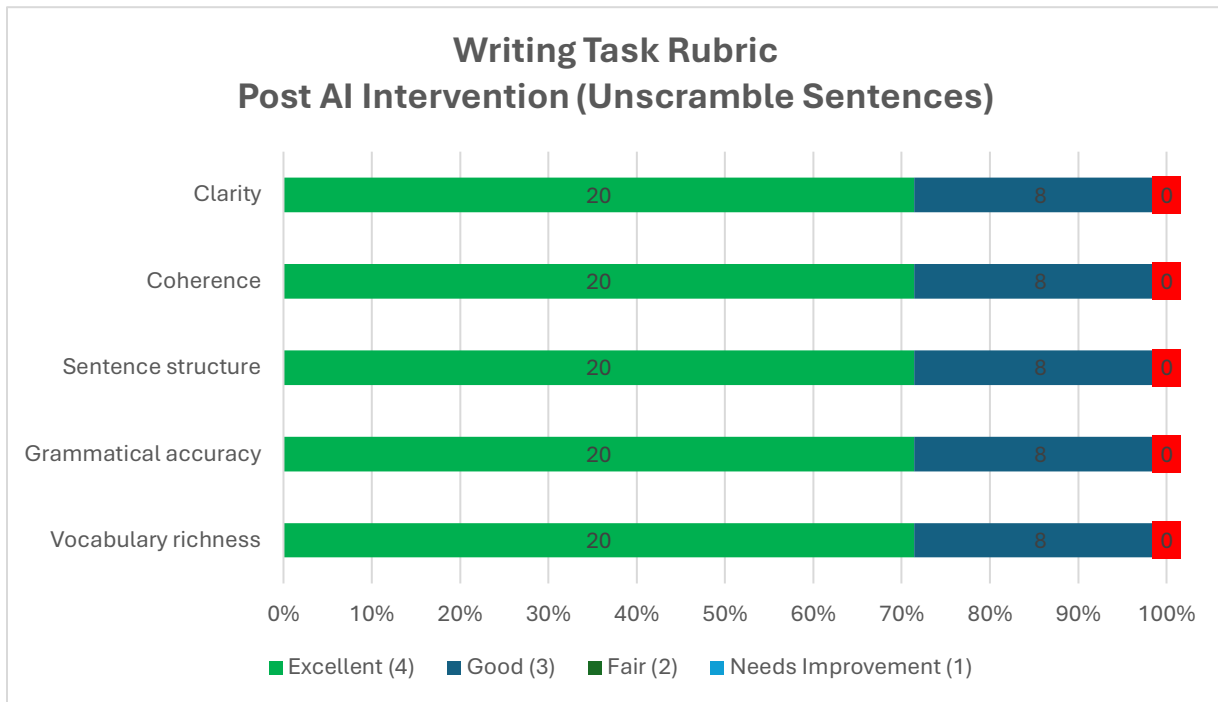


Figure 5 presents the results of the final writing activity conducted with 28 fifth-grade students (1 student was absent) at Escuela Carlos Sanabria Mora, marking the conclusion of the AI-assisted intervention. In this exercise, the researcher wrote 28 scrambled sentences on the board. Each student took turns coming to the front of the class to rewrite one sentence in what they believed was the correct form. After returning to their seat, they used an AI platform, such as ChatGPT or Quillbot, to independently review and revise their sentences, then returned to the board to correct it publicly.

This dynamic fostered a highly interactive and reflective learning environment. Unlike previous activities, this one emphasized individual accountability, peer learning, and self-correction through technology. The public nature of the task encouraged students to be attentive and precise, while the use of AI tools provided immediate feedback that reinforced grammatical structures and vocabulary usage.

The results show a remarkable improvement: 20 students achieved an “Excellent” rating across all evaluated categories (vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity), and 8 students were rated as “Good.” No students fell into the “Fair” or

“Needs Improvement” categories. This outcome suggests that students not only benefited from AI feedback but also internalized the corrections and applied them effectively.

The activity aligns with the study’s specific objectives. First, it demonstrates how AI tools can support writing improvement by helping students identify and correct errors in real time. Second, it shows the effectiveness of implementing AI in a structured, student-centered activity. Third, the results provide clear evidence of the positive impact of AI-based writing tasks on students’ performance.

Moreover, the exercise promoted learner autonomy and confidence, as students were responsible for evaluating and improving their own work. The combination of traditional classroom interaction (writing on the board) with modern AI support created a blended learning experience that was both engaging and pedagogically sound.

In conclusion, the results of Figure 5 reinforce the value of integrating AI tools into ESL writing instruction. The significant improvement in writing quality and the high level of student engagement suggest that AI can be a powerful ally in developing writing skills, especially when paired with interactive and reflective classroom strategies.

Figure #6: Classroom Observation Checklist

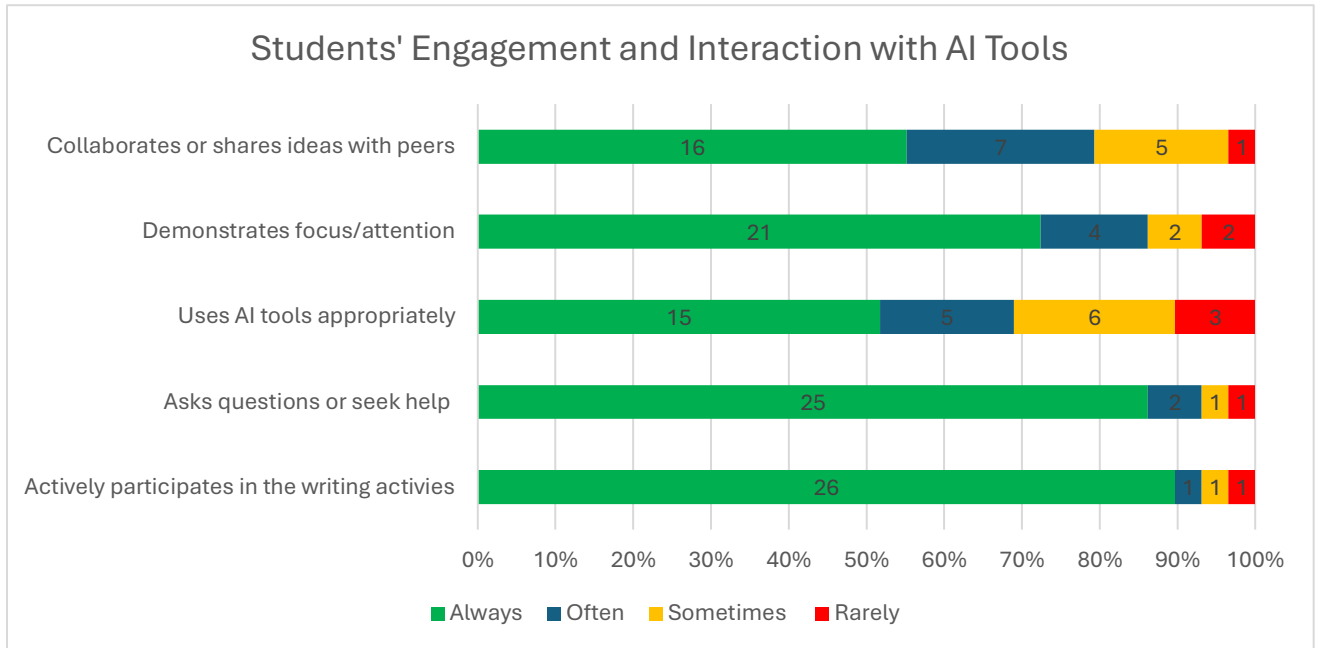


Figure 6 presents the results of the classroom observation checklist used to monitor student behavior and engagement during the AI-assisted writing activities. The checklist evaluated five key indicators: active participation in writing tasks, help-seeking behavior, appropriate use of AI tools, focus and attention, and peer collaboration. These categories were rated on a four-point scale: Always, Often, Sometimes, and Rarely.

The data reveal that the majority of students consistently demonstrated high levels of engagement. Specifically, 26 students were observed to “Always” participate actively in writing activities, and 25 “Always” asked questions or sought help when needed. These findings suggest that the integration of AI tools fostered a supportive and interactive learning environment where students felt comfortable engaging with the content and seeking clarification.

Regarding the use of AI tools, 15 students were rated as “Always” using them appropriately, while others fell into the “Often” and “Sometimes” categories. This variation highlights the importance of digital literacy and guided instruction when introducing technological tools in primary education. Although most students adapted well, a small group required additional support to navigate the platforms effectively, reinforcing the need for teacher facilitation and scaffolding.

Focus and attention were also notably high, with 21 students rated as “Always” attentive during the activities. This suggests that the use of AI tools contributed to sustained concentration, likely due to the interactive and immediate nature of the feedback provided. Similarly, peer collaboration was evident, with 16 students “Always” sharing ideas or working together, indicating that the classroom environment encouraged cooperative learning alongside individual accountability.

These observations align with the study’s broader pedagogical goals, particularly the promotion of learner autonomy, motivation, and engagement through technology-enhanced instruction. The data also support the idea that AI tools, when integrated thoughtfully, can complement traditional teaching methods and foster a dynamic classroom culture.

In conclusion, the results of Figure 6 demonstrate that AI-assisted writing activities positively influenced student behavior and participation. The high levels of engagement, appropriate tool usage, and collaborative interactions observed throughout the intervention underscore the potential of AI to enrich ESL instruction in primary education settings.

Figure #7: Students Questionnaire

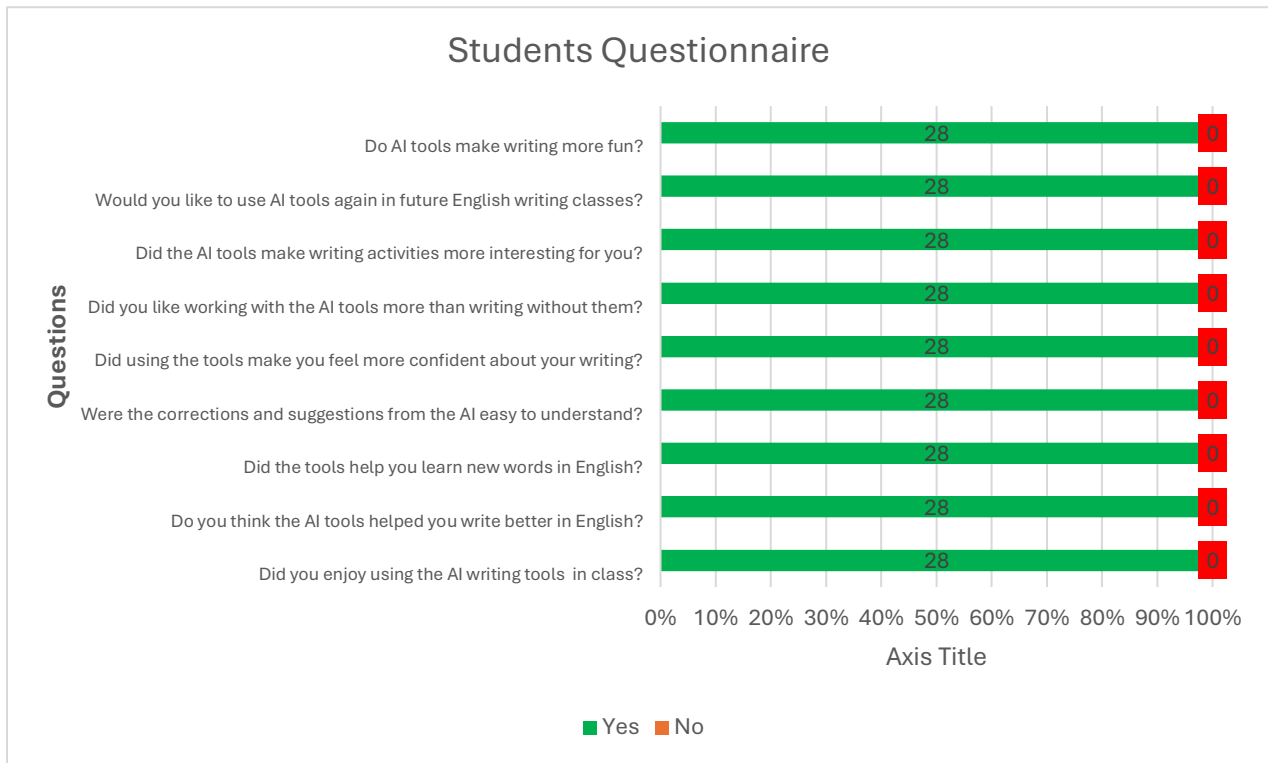


Figure 7 presents the results of a closed-question questionnaire administered to fifth-grade students at Escuela Carlos Sanabria Mora following the AI-assisted writing intervention. The questionnaire aimed to capture students’ perceptions, attitudes, and experiences regarding the use of Artificial Intelligence (AI) tools in English writing activities.

The results were overwhelmingly positive: all 28 students responded “Yes” to every question. This unanimous feedback indicates a high level of satisfaction and enthusiasm toward the integration of AI tools in the classroom. Students reported that they enjoyed using the tools, felt that the tools helped them write better in English, learned new vocabulary, understood the corrections provided, and felt more confident about their writing. Additionally, all students expressed a preference for working with AI tools over traditional writing methods and showed interest in using them again in future English classes.

These findings suggest that AI tools not only supported technical aspects of writing, such as grammar and vocabulary, but also contributed to affective factors like motivation, confidence,

and enjoyment. The positive emotional response is particularly significant in primary education, where engagement and self-esteem play a crucial role in language acquisition. The tools' interactive nature and immediate feedback likely contributed to this outcome, making writing tasks more dynamic and accessible.

The questionnaire results also align with the broader pedagogical goals of the study, particularly the promotion of learner autonomy and digital literacy. Students' willingness to use AI tools independently and their desire to continue using them in future classes reflect a shift toward more self-directed learning behaviors. This supports the idea that AI can foster a sense of ownership over the learning process, even among young learners.

Moreover, the unanimous responses highlight the potential of AI tools to reduce writing anxiety and create a more inclusive learning environment. When students feel supported and empowered by technology, they are more likely to take risks, revise their work, and engage deeply with the writing process. This is especially valuable in ESL contexts, where learners often struggle with confidence and fear of making mistakes.

In conclusion, the results of Figure 7 demonstrate that AI tools were not only effective in improving writing skills but also highly appreciated by students. Their positive attitudes toward the tools suggest that AI can play a meaningful role in enhancing both the cognitive and emotional dimensions of language learning. These findings reinforce the importance of integrating technology in a way that is developmentally appropriate, engaging, and responsive to students' needs.

Chapter V

Conclusions and Recommendations

This section contains the conclusions and recommendations reached by the researcher after concluding the investigation and analyzing the gathered data. It also offers practical and theoretical recommendations for educators, discusses the limitations of the study, and suggests directions for future research.

Conclusions

To Identify Key Elements of Artificial Intelligence as Tools to Support Writing Skill Improvement.

The study revealed that AI tools such as ChatGPT, and Quillbot possess essential features that directly address common challenges faced by ESL learners. These tools provide real-time grammar correction, vocabulary enhancement, and sentence restructuring, which are critical for improving writing accuracy and fluency. For example, Quillbot assisted in reorganizing sentences for better clarity, while ChatGPT offered contextual suggestions and explanations, enabling students to understand why certain corrections were necessary.

These features collectively create a dynamic learning environment where students receive immediate, personalized feedback, something traditional classroom settings often lack due to time constraints and large class sizes. The ability of AI tools to adapt to individual needs supports differentiated instruction, making them valuable resources for addressing diverse proficiency levels within the same classroom. This finding underscores the potential of AI to complement teacher-led instruction by filling gaps in feedback and providing scaffolding for independent learning.

To Implement Artificial Intelligence Tools to Support the Development of Writing Skills

The implementation process demonstrated that AI tools can be effectively integrated into classroom activities when combined with structured guidance. Students engaged in tasks such as sentence unscrambling and personal information writing, first completing them independently and then revising their work using AI feedback. This two-step approach encouraged active

learning and reflection, as students compared their original drafts with AI-generated suggestions.

Observations during these activities indicated high levels of engagement and enthusiasm. Students were motivated by the interactive nature of the tools and expressed enjoyment in using technology to improve their writing. Importantly, the integration of AI did not replace teacher involvement; rather, it enhanced the teacher's role as a facilitator who guided students in interpreting feedback and applying corrections meaningfully. This blended approach aligns with modern pedagogical principles that emphasize learner autonomy, collaboration, and the use of technology as a supportive element in education.

To Evaluate the Impact Of AI-Based Activities on Writing Skill Development in Fifth Graders

The impact of AI-assisted activities was evident in the post-intervention results. Students showed significant improvement across all evaluated components: vocabulary richness, grammatical accuracy, sentence structure, coherence, and clarity. In the final assessment, no students were rated as "Fair" or "Needs Improvement," and the majority achieved "Excellent" scores. This progression from initial challenges, such as fragmented sentences and phonetic spelling errors, to well-structured and coherent writing demonstrates the effectiveness of AI tools in addressing persistent linguistic issues.

Beyond measurable improvements, qualitative data from questionnaires and classroom observations revealed positive changes in students' attitudes toward writing. All participants reported feeling more confident and motivated, and expressed a desire to continue using AI tools in future lessons. This suggests that AI not only enhances technical aspects of writing but also contributes to affective factors such as self-esteem and willingness to engage with the learning process. These findings highlight the transformative potential of AI in creating inclusive, engaging, and effective learning environments for young ESL learners.

Recommendations

Based on the findings and conclusions of this study, several actions are suggested to enhance the integration of Artificial Intelligence tools in primary ESL writing instruction. These recommendations aim to guide educators and institutions in leveraging technology effectively while ensuring pedagogical quality and equity.

Teacher Training in Educational Technology

Teachers play a critical role in AI-enhanced classrooms. Therefore, professional development programs should focus on equipping educators with the skills to integrate AI tools effectively. Training should include technical aspects (how to use platforms like ChatGPT, and Quillbot) and pedagogical strategies (how to align AI use with curriculum goals). Well-prepared teachers can ensure that AI complements instruction rather than replacing it, fostering meaningful learning experiences.

Gradual Integration of AI Into the English Curriculum

Artificial Intelligent tools should be introduced progressively to avoid overwhelming students and teachers. Initial activities can involve guided exercises where students use AI under teacher supervision, followed by more autonomous tasks as their confidence grows. This gradual approach allows learners to develop digital literacy and writing competence simultaneously, ensuring that technology supports the learning process.

Strengthening Digital Literacy in Primary Education

Digital literacy is essential for students to use AI tools responsibly and effectively. Instruction should go beyond basic navigation skills to include interpreting AI feedback critically, understanding why corrections are made, and applying suggestions thoughtfully. Teaching these skills helps prevent overreliance on technology and promotes deeper learning, empowering students to become independent writers rather than passive recipients of automated corrections.

Continuous Evaluation of AI's Educational Impact

To ensure sustainable benefits, schools and researchers should conduct ongoing evaluations of AI integration. Some studies can measure the long-term effects of AI on language proficiency, motivation, and learner autonomy. Regular assessments will help identify best practices, address emerging challenges, and refine strategies for effective implementation.

Promoting Technological Equity in Public Schools

Equitable access to technology is crucial for the success of AI-enhanced learning. Educational policies should prioritize infrastructure improvements, such as reliable internet connectivity and updated devices, especially in under-resourced schools. Without these measures, AI risks widening educational gaps rather than closing them. Ensuring that all students have access to digital tools will promote fairness and inclusivity in language education.

Limitations

The study was limited to one public school and one academic term, which restricts generalizability. Access to technology was temporary, and some students required additional time to adapt to digital tools, which may have influenced the effectiveness of the intervention.

Suggestions For Future Research

Future studies should explore AI integration in other language skills (reading, speaking) and examine its effectiveness in diverse educational contexts, including rural schools and students with special needs. Research could also investigate the long-term impact of AI on learner autonomy and critical thinking.

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Annexs

The following annexes contain the supporting materials used and produced throughout the development of this research project entitled “The Use of Artificial Intelligence (AI) Tools as a Strategy to Enhance Writing Skills on Fifth Graders at Escuela Carlos Sanabria Mora in Pavas during the Second Term of 2025.”

These documents serve as evidence of the research process, data collection instruments, and student performance samples. They provide complementary information that reinforces the validity and reliability of the study’s findings.

The annexes include the student questionnaire, teacher interview guide, writing rubric, classroom observation checklist and photos of students writing samples. Each annex is presented in the order in which it was applied or utilized during the research process.

Annex 1. Writing task rubric used to evaluate students

Writing Task Rubric

Evaluate students' writing pre- and post-AI intervention.

Student's name:

Grade:

Component	4 – Excellent	3 – Good	2 – Fair	1 – Needs Improvement
Vocabulary Richness	Uses a variety of precise words correctly (0-1 errors)	Uses some variety; mostly correct (1-2 errors)	Limited vocabulary; some errors (3-4 errors)	Very limited vocabulary; many errors (4 or more errors)
Grammatical Accuracy	Almost no errors (0-1 errors)	Few minor errors (1-2 errors)	Several errors affecting clarity (3-4 errors)	Frequent errors that obscure meaning (4 or more errors)
Sentence Structure	Sentences are varied and complex (0-1 errors)	Mostly correct sentence structure (1-2 errors)	Some incomplete/awkward sentences (3-4 errors)	Many incomplete or awkward sentences (4 or more errors)
Coherence & Organization	Ideas are very clear and well-organized (0-1 errors)	Mostly clear and logical (1-2 errors)	Sometimes unclear or disorganized (3-4 errors)	Hard to follow; ideas not connected (4 or more errors)
Clarity	Writing is clear and easy to understand (0-1 errors)	Mostly clear (1-2 errors)	Sometimes unclear (3-4 errors)	Very unclear (4 or more errors)

Annex 2. Classroom observation checklist

Classroom Observation Checklist

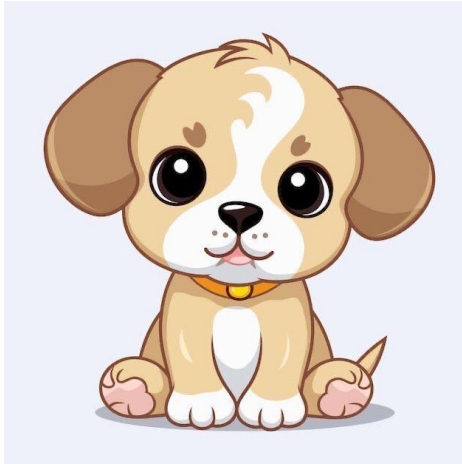
Observe students' engagement and interaction with AI tools.

Student's name:

Grade:

Behavior	Always	Often	Sometimes	Rarely	Notes
Actively participates in the writing activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Asks questions or seeks help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Uses AI tools appropriately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Demonstrates focus/attention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Collaborates or shares ideas with peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Annex 3. First pre-AI intervention exercise (Short texts)



My House ✓

My house is ^{small} esmot. ✓

It is near mye School. ✓

There are two
Peg at Dow seems.

we have ^{There a Kitchen}
wi af a bathrom Der is kitchen

with ~~nice~~ ent flowers
nice trees and

My Dog max ✓

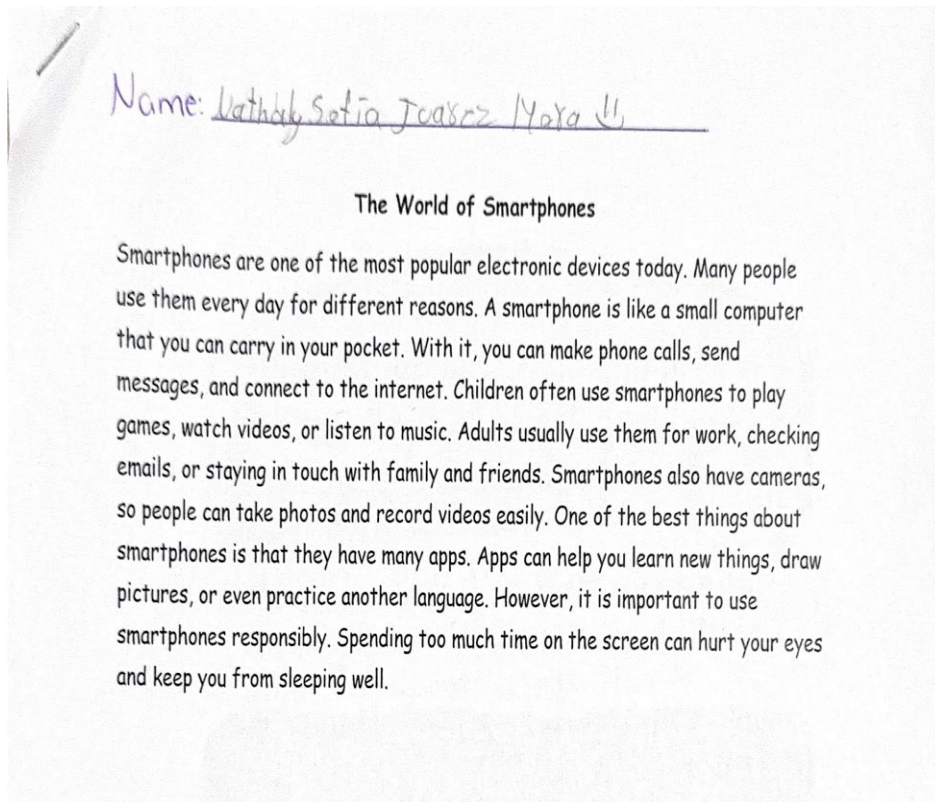
My name is Ana ^{It} small and brown
^{his} dog name is max is esmal en brow

^{He} Gil likes ^{to run and} dow ron en play

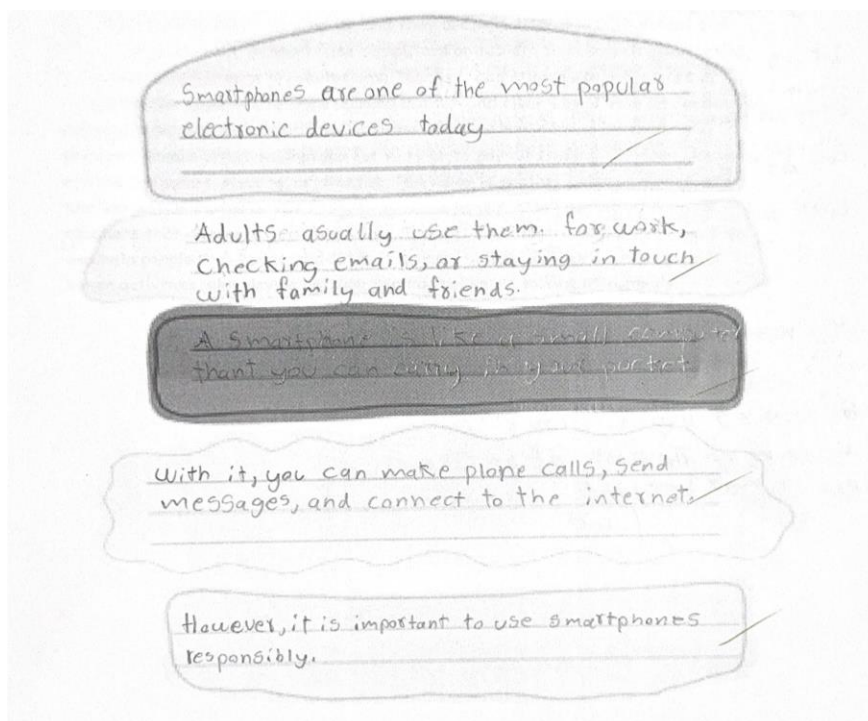
Wi walk in the park after School ✓

max is mye bestom!
frend

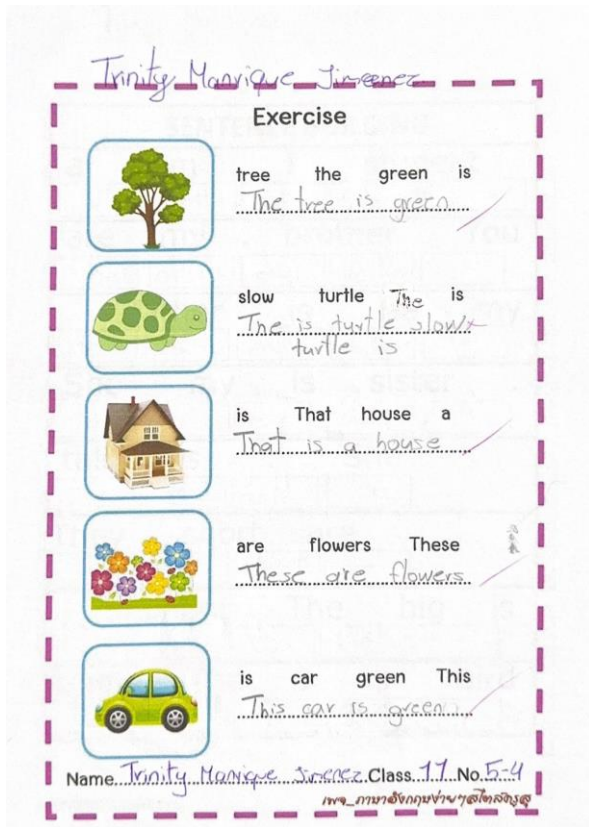
Annex 4. Second pre-AI intervention exercise (Hamburger organizer)



Smartphones are one of the most popular electronic devices today. Many people use them every day for different reasons. A smartphone is like a small computer that you can carry in your pocket. With it, you can make phone calls, send messages, and connect to the internet. Children often use smartphones to play games, watch videos, or listen to music. Adults usually use them for work, checking emails, or staying in touch with family and friends. Smartphones also have cameras, so people can take photos and record videos easily. One of the best things about smartphones is that they have many apps. Apps can help you learn new things, draw pictures, or even practice another language. However, it is important to use smartphones responsibly. Spending too much time on the screen can hurt your eyes and keep you from sleeping well.



Annex 5. First during AI intervention exercise (Unscramble sentences)



ChatGPT ▾

Get Plus ×

Memory full

Share ...

esta oración está bien gramaticalmente? the is slow turtle

No 😊, "the is slow turtle" no está bien gramaticalmente.

La forma correcta sería:

✅ **The turtle is slow.**

★ Explicación:

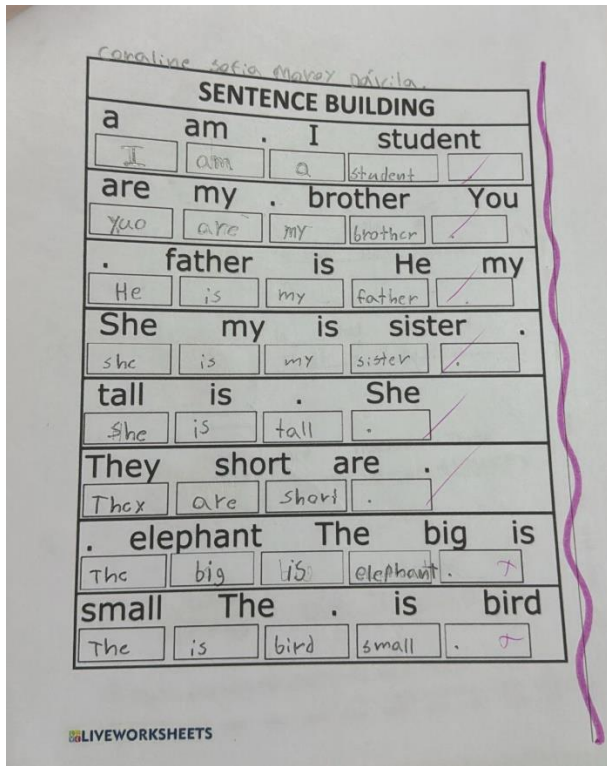
- **The turtle** → sujeto (artículo + sustantivo).
- **is** → verbo *to be*.
- **slow** → adjetivo.

En inglés, el adjetivo va **después del verbo to be**, no antes del sustantivo en este caso.

👉 Por eso:

- ❌ the is slow turtle
- ✅ the turtle is slow

¿Quieres que te dé más ejemplos de animales con **ac** ↓ vos para que veas bien el orden?



QuillBot Grammar Checker

Untitled document English (US) Enter writing task

The is bird small.

All Grammar 1 Recommendations

- Change the word order
 - The ~~is~~ **bird** **bird** is small.
 - The ~~is~~ **bird** bird is small.

Accept Ignore

Waiting for words...

Annex 6. During AI intervention exercise (All about me)

ALL ABOUT ME

Arianny Michell Umaña Delgado

1- My name is: Arianny ✓

2- My birthday is on: December 22nd ✓

3- I am ten years old ✓

4- My favorite hobby is run ✓

5- My favorite Subject Inglish ✓

6- My favorite Game roblox ✓

7- My favorite Movie titanic ✓

8- My favorite Song Villano ✓

9- My favorite Person trini-elán-sara ✓

10- My favorite Color PiK pink ✓

11- My favorite food Sebiche ceviche ✓

12- My favorite DRINK COU coca ✓

QuillBot Grammar Checker

Untitled document

English (US) Enter writing task

My favorite subject is inglsh.

Correct the spelling error

is inglsh: English.

My favorite subject is inglsh: English.

Accept Ignore

Waiting for words...

Annex 7. Students' questionnaire (Yes or no)

1. Did you enjoy using the AI writing tools (Quillbot or ChatGPT) in class?
2. Do you think the AI tools helped you write better in English?
3. Did the tools help you learn new words in English?
4. Were the corrections and suggestions from the AI easy to understand?
5. Did using the tools make you feel more confident about your writing?
6. Did you like working with the AI tools more than writing without them?
7. Did the AI tools make writing activities more interesting for you?
8. Did the tools help you write faster and easier?
9. Do AI tools make writing more fun?

Annex 8. Teacher’s interview (Questions and Answers)

1. How would you describe your overall experience using AI tools (e.g. Quillbot, ChatGPT) with your fifth-grade students?
 - a. “Students in primary level is not that easy”
2. What are the main benefits of integrating AI tools into writing lessons for young ESL learners?
 - a. “The benefits are that kids can check spelling, grammar, vocabulary and understanding.”
3. Which aspects of writing (e.g., vocabulary, grammar, sentence structure, organization) do you think improved the most with the use of AI?
 - a. “Definitely structure and grammar.”
4. How did the students react to using AI tools in the classroom? Did you notice changes in their motivation or participation?
 - a. “They were so excited. Yes, they were more motivated and participative.”
5. Did you observe students becoming more independent or confident in their writing when supported by AI tools?
 - a. “A little bit.”
6. What challenges or difficulties did you encounter when implementing AI tools (technical, pedagogical, or student-related)?
 - a. “They don't have internet connectivity at school.”
7. Do you consider AI tools appropriate for students aged 10–11? If your answer is no. Why not?
 - a. “Totally, they are very useful.”
8. How do you see the role of AI tools evolving in primary education over the next few years?
 - a. “I can tell that is going to be super necessary.”