

**The Effectiveness of Using ProWritingAid AI software with Scaffolding Strategies to
Develop Coherence of Ideas in Writing on Eleventh Grade Students from New Hope
Bilingual School During the I Quarter 2024**

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SWORN OF DECLARATION

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Licenciatura en la Enseñanza del Inglés

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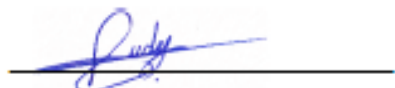
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RESUMEN

Este proyecto abarca la Inteligencia Artificial con relación a la habilidad de escritura del idioma inglés. El programa de IA utilizado en esta investigación es ProWritingAid. Esta investigación es llevada a cabo en el Complejo Educativo Bilingüe Nueva Esperanza ubicado en Santa Bárbara de Heredia. El objetivo principal de este proyecto es la implementación de la IA.

El primer capítulo presenta el problema de investigación, el cuál transmite la causa principal por la que se lleva a cabo este proyecto. También, contiene los antecedentes para respaldar la tesis. Los objetivos de la investigación son un aspecto clave del proyecto. Se desarrolla la razón por la cual se debe estudiar este tema. Por último, se muestran los alcances y limitaciones de la investigación.

En el segundo capítulo, se describe la base teórica. Inicia con el contexto histórico de la institución donde la investigación toma lugar. Además, el capítulo proporciona información valiosa para respaldar la investigación. Muestra información acerca de la Inteligencia Artificial como el origen, los tipos, características, etc. También, las características de la estrategia de andamiaje en el aula. Finalmente, las estrategias de escritura en conjunto con la IA y los beneficios y desventajas hacia la educación.

En el capítulo tres, la metodología aplicada es mostrada. Aspectos tales como el tipo de investigación y la naturaleza son descritos, junto con la población y fuentes de estudio. También, se mencionan las técnicas e instrumentos para recolectar información. Los instrumentos tienen como fin recolectar todos los datos que va a ser analizados.

Seguidamente, el capítulo cuatro muestra la recopilación de datos. En este capítulo, la información se muestra gráficamente y es analizada. Todas las partes de los instrumentos

utilizados son observadas cuidadosamente, ya que la información es relevante para mostrar los principales resultados del proceso de investigación.

El capítulo cinco muestra las principales conclusiones y las recomendaciones de la presente investigación. Las conclusiones mencionan que a través de ProWritingAid los estudiantes pueden incrementar sus habilidades de escritura en las clases de inglés. Igualmente, algunas recomendaciones son hacia la ejecución de futuras investigaciones sobre este tema y programa para obtener resultados más evidentes.

Finalmente, en el capítulo seis, el investigador, desarrolla una propuesta basada en el objetivo “Demostrar el uso del programa de Inteligencia Artificial ProWritingAid en las habilidades de escritura con estudiantes de undécimo año”. Esta propuesta consiste en una comparación sobre la forma en que los estudiantes escriben por sí mismos, en comparación con el uso del programa ProWritingAid. El objetivo es contrastar la escritura con y sin IA. Se pretende tener un enfoque diferente respecto a la presente investigación.

ABSTRACT

This project encompasses Artificial Intelligence in relation to the writing skill of the English language. The AI software used in this investigation is ProWritingAid. This research is carried out at New Hope Bilingual School located in Santa Bárbara de Heredia. The main focus of this project is the implementation of AI.

The first chapter presents the research problem, which conveys the main cause why this project is carried out. Also, it contains the background to support the thesis. The objectives of the investigation are the key aspects of the research. The reason why this topic should be studied is developed. Lastly, the scope and limitations of the research are shown.

In the second chapter, the theoretical basis is described. It starts with the historical context of the institution where the research is held. In addition, the chapter provides valuable information to support the investigation. It shows information regarding Artificial Intelligence, such as the origin, the types, characteristics, features, etc. Also, characteristics of scaffolding as a strategy in the classroom. Furthermore, the writing skills along with AI and the benefits and disadvantages towards education.

In chapter three, the methodology applied is presented. Aspects such as the type of research and nature of the research are described, along with the subjects and sources of study. Also, it mentions the techniques and instruments of data collection. The instruments are in charge of collecting all data that is going to be analyzed.

Then, chapter four shows the data collection. In this chapter, the information is shown graphically, and it is analyzed. Every part of the instruments used in the research is observed carefully since the information is relevant to show the main results of the investigation process.

Chapter five shows the main conclusions along with recommendations of the present investigation. The conclusions mention that through ProWritingAid students can increase their writing skills in the English classes. Likewise, some recommendations are pointed to the execution of future research regarding this topic and software to gather more evident results.

Finally, in chapter six, the researcher develops a proposal based on the stated objective “To demonstrate the use of ProWritingAid AI software in writing skills with eleventh grade students.” This proposal consists of a comparison on the way students write by themselves, compared to using ProWritingAid AI software in their writing. The goal is to contrast writing with AI and without it. It aims to have a different approach compared to the present research.

CHAPTER I: RESEARCH PROBLEM

1.1 Introduction

In the last years, the use of technology has rapidly advanced in every field, such as engineering, science, administration, education, etc. Technology has been part of humans' daily life, and it is a tool that is needed to do almost any job. Nowadays, the use of technology not only alleviates work, but also facilitates life in such an easy way.

The new advances of technology have gained notorious recognition in what is called Artificial Intelligence, which is usually abbreviated as AI. According to Wartman & Combs (2018) as cited by Gocen & Aydemir (2020), "the ability of machines or computers to think and act as humans do, represents the efforts towards computerized systems to imitate the human mind and actions" (p.13). Basically, these AI programs are new tools that can ease work. This topic is a new acquisition that has recently been used by many users.

Artificial Intelligence is software that is used on a regular basis. There are many AI apps such as Siri, Alexa, Language Tool, Google Assistant, ChatGPT, ProWritingAid, among others. They are used all over the world by many users. Besides, there are apps for many purposes depending on what the user needs them for. Actually, there is AI software for working purposes, study matters and leisure activities, depending on what people need AI for. The use of AI is continually advancing and improving efficiency. It can be a beneficial way for healthcare, education, business work, and more. For this reason, Artificial Intelligence is a topic necessary to manage new technologies.

Also, AI can be a great tool for implementing and using in any environment; however, it can raise concerns in people about privacy, automation on jobs, providing answers, etc. It is important to build up a balance between the new technologies and the use people are giving them. "These models can perform a range of language tasks and generate human-like responses,

which offers exciting prospects for academic efficiency” (Dergaa, 2023, p.615). Actually, AI seeks to do human tasks with the potential to bring outcomes to this new era.

Therefore, AI has obtained a significant role in the educational field. Teachers and students are using these platforms in their studies. But the main issue is, are they willing to use it in the correct way? The use of AI is not an easy task because it comes out of the ordinary. According to Bates et al. (2020), “Many educators need to be convinced that a new idea can enrich or extend learning outcomes and experiences, so the education sectors remain highly conservative toward new technologies” (p.5). With the implementation of new equipment, as AI, the educational environment is creating an ingenious and secure learning setting.

The use of AI in Costa Rica is obtaining prominent perception, but the demand of using these tools correctly is increasing. Students are using these tools without supervision, or previous background. This can be a concerning situation for teachers and parents. One of the most worrying situations that can occur is that AI can produce answers as if it were a human being. “For a few years now, it has been evident that AI can produce coherent language, and it is becoming increasingly challenging to distinguish AI sentences from those created by humans” (Dergaa, 2023, p.615). It is a tool that is part of daily life and the use of it can aid the population in general.

In fact, the use of AI is an interesting and innovative field of study. For this reason, it is necessary to research deeper in this new field. Humanity needs to have more contexts and examples on where to use AI in an effective, remarkable, and promising way because as being a new tool, it is important to educate the world’s population.

1.1.1 Background of the Problem

In the present research, there are studies proposed to support the AI investigation process. First, a study done about the use of AI and technology tools in the development of academic writing. This research was conducted to enhance the students' writing skills. According to Zulfa et al. (2023), "Unfortunately, students face impediments in academic writing properly regarding ideas, grammatical, vocabulary choices, cohesion, coherences, and others" (p.51). The main issue is that students lack these components when writing, so researchers wanted to know if by using AI and technology, students could overcome this situation. Besides, the necessity of students to master writing is crucial for their knowledge and effective communication.

The study proposed diverse objectives to accomplish the research. At first to understand the profound concepts about technology tools used by students in English academic writing. Also, to identify the students' perceptions about the benefits of using AI in their writing courses. Lastly, to list the impacts of using technology tools in English academic writing. With the achievement of this objectives, the researchers could know if the results were suitable to diminish the writing situation.

The population of this study were university students. The participants were 73 students from the State Islamic Universities in Indonesia. From which 39 of the subjects were female, and 34 were male. Actually, only 11 of them participated in the interviewing process because of their responses provided in the questionnaire.

In the study they applied diverse instruments to gather data such as interviews and questionnaires. In the results they collected information of the diverse technological tools students used to make their writing more efficient. For example, Grammarly, Mendeley, Google Scholar, DeepL, etc. They found out that by using these tools, students provide more efficiency,

quality, and availability in their writing. “The technology tools are divided into four categories based on their functions, namely language tools, sources, saving track, and references” (Zulfa et al., 2023, p.52). Besides, by using AI students got to have many opportunities in their learning process. In fact, with the use of AI motivation was a key aspect of their development. They felt that by implementing AI, their ideas were delivered more clearly.

To conclude, AI and its advances proportionate easiness for the student’s life. It can be proven that the use of these tools can provide positive results in writing. Tools such as Grammarly or QuillBot can help learners overcome writing problems and guide them in the writing process. AI and technology can give opportunities to enhance self-awareness, self-learning, and self-confidence in creating English academic writing that could be useful for society. Finally, the study proposes to have a balance using the convenience of media and their writing skills. (Zulfa, 2023, p.47-63)

In another study done by Kyoungwon Seo, Joice Tang, Ido Roll, Sidney Fels & Dongwook Yoon investigate about the impact of artificial intelligence on learner–instructor interaction in online learning. The research was conducted to know the effect Artificial Intelligence would have on students and teachers. The researchers wanted to know if the subjects of study perceived AI as a promising tool or as a threat. According to Seo (2021), “While the opportunities for AI are promising, students and instructors may perceive the impact of AI systems negatively” (p.2). It is no secret that AI proportionate aids when the user asks for them; however, some people can take this new acquisition as a negative impact. As well, in this study instructors were worried that relying too much on AI systems, could compromise the student’s ability to learn independently and in this way have a hard time while learning.

As part of the goals of this study, it was important to gather the insight or perception students had on the impact AI systems have. The study not only focuses on students, but also on instructors since they play a major role in the learning environment. AI has an impact on these participants in the learner–instructor interaction (inter alia, communication, support, and presence) and in online learning environments. In the research, the participants’ role was to be exposed to AI and in this way, create their own critics. Besides, they wanted to explore areas where AI systems positively contribute to learner–instructor interaction and where more attention was required. The idea was that the participants who were cursing online education, could figure out the relevance AI can have in their learning process.

The participants of this study were instructors and students. In this case, the subjects considered were 12 students and 11 instructors. It is necessary to mention that students and instructors were from 11 different majors and the participants had a minimum experience of three months of online learning or teaching.

As a result, they applied techniques such as storyboards and speed dating. In this project, they conducted interviews to know the participants’ opinion on the storyboard’s others created. Regarding the results obtained, “adopting AI systems in online learning can enable personalized learner-instructor interaction at scale but at the risk violating social boundaries” (Seo, 2021, p.10). The participants were concerned that AI systems could create responsibility, agency, and surveillance issues if they violated social restrictions in each factor of the interaction. They expressed that they were worried AI could give unreal information. Teachers stated that AI is impossible to understand social interaction, so in this way it affected students’ development in online learning. AI could show students to be self-conscious and, in this way, use the AI systems more than necessary.

To conclude, researchers found out that even though it has proved that AI systems have positive impacts, the concerns of students and teachers are broad. According to Seo (2021), “AI would limit their ability to learn independently” (p.16). Besides, by using AI they fear privacy issues since they have contact with the virtual system continuously. Even though students appreciate the support of AI, they are worried that standardized support would have a negative influence on their own learning. Instructors feared that students would not be able to learn new skills and lose opportunities due to the appearance of these tools.

As for recommendations, to keep instructors involved is a must. It is necessary not to leave them out of the learning process since they are the ones who know their students. Besides, for future researchers, they recommend investigating how to ensure the knowledge of AI systems in the online learning communication context. Another recommendation is that it should be considered the different learner–instructor interaction needs of participants from different majors. Thus, for participants to have direct contact and use of the AI system, not only by using a resource. (Seo, 2021, p.1-23)

Lastly, it is considered another research performed in Costa Rica about using AI in STEM Education. The research was carried out to understand how Artificial Intelligence could create innovative, effective, efficient, accurate and at low-cost solutions in diverse fields. This research focuses on using interactive and innovative resources for students to get better learning opportunities. The main inconvenience in this project was the lack of preparation students had due to the outdated curriculum and methodologies applied.

The following research had diverse objectives to enrich the STEM methodology in the curriculum. By doing this, students could have more opportunities to develop critical thinking, problem solving, teamwork, leadership, etc. Also, motivation in the idea of the need of inclusion,

diversity, and self-confidence. Most importantly, to encourage and incorporate AI in an ethical manner that benefits society.

The participants of this study were high school and non-engineering participants. Their age range was between 15 to 20, from public institutions and of groups made up of 20-30 students. The non-engineering participants were from higher education.

The main results obtained during the investigation process were as follows. They found out that “educational robotics is one resource to promote inclusion, interaction, interdisciplinarity, problem solving, and collaborative work, developing a set skills and cross-functional learning, including: teamwork, cooperative learning, leadership, entrepreneurship, logical thinking, psychomotricity, creativity, curiosity, concentration, and mathematics” (Xie-Li & Arias, 2023, p.47). With the use of hands-on, students are able to explore the world on their own without using memorization or traditional learning strategies. With the exposure to AI, they gathered that students could reinforce their communication, time management and debugging skills.

Therefore, some of the conclusions gotten from this study were that AI, STEM and robotics should be included in the high school’s curriculum. They believe that by applying this, students are going to develop more skills needed for the present time. Also, the usage of technology is a great tool nowadays which is necessary to use as much as possible.

Some recommendations were to revise literature concerning the awareness of potential ethical issues in the field of AI. It is important to know this if it will be applied in the school environment. Besides, the inclusion of a program similar in the school’s curriculum can be

necessary to have students updated. Lastly, to prepare pedagogical material for students' usage to accomplish with the usage of AI and STEM. (Xie-Li & Arias, 2023, p.45-52)

1.1.2 Problematization

In the last couple of years, Artificial Intelligence (AI) has gained notorious recognition. In the present time, it has become a tool in which students and teachers are lying in; more than just considering it as an easy way to get answers, it is a tool to help people with their jobs, life, and daily basis.

The use of AI in the educational system is not confidential. It is a tool that has achieved identification. As for this, it seems as if these systems have come to stay, and it is the teacher's duty to show students how to use them. "With more usage of artificial intelligence in education, major transformations can be foreseen in the education systems and their processes" (Gocen & Aydemir, 2020, p.14). AI is a new acquisition, but not everyone knows how to use it. In fact, with the new appearance of this tools, institutions have to analyze the use of these because it is the reality they are currently facing.

Considering the new tools that are part of the daily basis, students have been using AI in tasks, homework, exams, quizzes, and even in class. Besides, more than using it at everything they do, the use of AI in the writing skill has been a significant outlook. This is a worrying situation because students are not achieving evaluations by their own critical thinking analysis. They are just getting their answers right away without even worrying about their learning process.

Therefore, the use of AI is a tool that can benefit or damage students' learning process. According to Gocen & Aydemir (2020), "There will be associated benefits, drawbacks and risks

for schools with the arrival of AI into schools” (p.19). As a result, the main inconvenience is that students are damaging their studies and their second language acquisition process. Also, what can be more disturbing is the level of consciousness high school students have. These students have a lack of interest in their studies, and this can play a significant role in their personal and professional formation.

It is important to mention that there are a lot of Artificial Intelligence platforms people can employ. Mostly, there is a platform for anything you need. However, the effectiveness cannot be compared to correctness. The AI systems can proportionate not accurate information. According to Baidoo-Anu & Owusu Ansah (2023), it “has been found to have several serious inherent limitations, such as generating wrong answers and making-up articles that do not exist” (p.58). This is only one limitation, but how many more can these systems have?

Thus, one of the most worrying situations is that students are not developing their writing skills by themselves. They are asking these programs just to come up with the answers and not even caring if the information is relevant. For this reason, the effective use of this platforms is considerably important and applicable for a person’s professional development. At the end, AI is a tool that has come to stay to the educational system, so the prohibition to use it can be almost impossible. As a result, with the appropriate use of this platforms maybe it can develop writing skills more effectively.

1.1.3 Justification

The demand for the use of Artificial Intelligence has increased rapidly. For this reason, the use of these technological tools has played a significant role in the 21st century and mostly in recent years. As humans, it is necessary to have knowledge of new and innovative topics that are

taking place. For this reason, it is required to know about AI and the impact it can have on the global population.

The understanding of AI can open a wide range of opportunities mostly in any field because companies and institutions are using the new technology in their working environment. One characteristic is that AI can be highly used for problem solving, which can benefit future professionals. It is not only beneficial, but it also is a skill required in the present time. According to Agrawal (2017), “The flurry of interest in AI is triggering a variety of reactions — everything from excitement about how the capabilities will augment human labor to trepidation about how they will eliminate jobs” (p.2). Besides, with the use of AI establishments can advance and have new perspectives needed to succeed; however, the correct way to use AI is the main inconvenience here.

One of the most important aspects why this topic is relevant is the boundaries AI can provide to humanity. For example, the development of AI systems is a process of responsibility in which people must have knowledge on how to use and manage this artificial intelligence software. The only way to get to realize if these systems really work is by using them. People “must use it responsibly and with caution to avoid any unintended consequences” (Dergaa, 2023, p.618). In this way, people can uncover if these AI systems can produce optimistic results.

Writing skills are the hardest to acquire when learning a new language. It is a skill that is learned through life. For this reason, AI is relevant for this study. With the use of AI, learners could develop more advanced writing skills, or they could get inexperienced with them. Therefore, the necessity of studying and acknowledging if AI can delete this barrier, could prove their impact on students’ language acquisition.

In this investigation, it is analyzed the use of Artificial Intelligence in the educational environment. AI is a tool that is being used by students in their classes and homework because they proportionate the answers. But how can the use of AI increase students' learning opportunities? The use of AI shows how students can get better at many life and language skills. In this case, with the use of these innovative systems, students can increase their writing skills and become more efficient.

1.2 Problem Statement

Struggles eleventh grade students have in developing coherence of ideas while performing writing tasks and activities related to this skill.

1.2.1 Research Question

What is the effectiveness of using ProWritingAid AI software with scaffolding strategies to develop coherence of ideas in writing on eleventh grade students from New Hope Bilingual School during the I quarter 2024?

1.2.2 Hypothesis

Eleventh grade students from New Hope Bilingual School will improve their coherence of ideas in writing by using ProWritingAid AI software.

1.3 Objectives

1.3.1 General Objective

Determine the effectiveness of using ProWritingAid AI software with scaffolding strategies to develop coherence of ideas in writing on eleventh grade students from New Hope Bilingual School during the I quarter 2024.

1.3.2 Specific Objectives

1. Establish the appropriate use of ProWritingAid AI software when developing writing tasks.
2. Identify the proper use of ProWritingAid as an AI software that enhances writing skills and coherence during the Literature & Language lessons.
3. Determine the correct procedure of writing skills and coherence of ideas handling AI software during the English lessons.
4. Examine the effectiveness of ProWritingAid AI software as a tool to enhance mechanics when writing.

1.4 Scope and Limitations

1.4.1 Scope

The present research paper is addressed to eleventh grade students from New Hope Bilingual School, specifically the class 11-2. The students' ages are 16-17 years old. Besides, the students who are part of the research are in the Literature & Language Skills class. There are four eleventh grade classes with approximately 25 students each. New Hope Bilingual School is located in Heredia, specifically in Santa Barbara.

The study is going to reach the inclusion of Artificial Intelligence in writing courses to increase the students' productivity. The present research is focused on coherence since students lack these skills. For this reason, by applying AI in the classes students could possibly use these resources for their advantage.

Also, New Hope Bilingual School is going to benefit from the present research. It can reassure if students really can use these tools effectively or if they are using them to their disadvantage. In fact, with this study the institution can act out based on the results gathered.

The project is carried out in the first quarter of 2024. Finally, the investigation is a great way to know the students' opinions, actions, and way of thinking towards AI in writing.

1.4.2 Limitations

One of the major limitations of the project is the size of the population. The investigation would have had more accuracy if the population and sample had been a bigger quantity. In fact, the subjects of this study were less than expected.

Also, the data availability present in Costa Rica is limited. There are not many studies done in the country to back up the Artificial Intelligence topic. In fact, in the educational field there are not quite many studies in the world to reinforce the research.

CHAPTER II: THEORETICAL FRAMEWORK

2.1 HISTORICAL CONTEXT

2.1.1. Origin of New Hope Bilingual School

The institution where the present investigation is held is New Hope Bilingual School. This is an educational institution, which includes preschool, elementary and high school. The institution was established in 1993 and it is located in San Juan de Santa Bárbara de Heredia. According to New Hope Bilingual School (2021):

“Somos un centro educativo bilingüe fundado en 1993. Nos enfocamos en una educación moderna e innovadora para el desarrollo multiculturalismo por nuestra diversidad en lenguas, conciencia ecológica y un sistema de enseñanza multimodal, apoyado en el uso de tecnología para el aprendizaje y formando seres humanos con integridad y sensibilidad humana para la convivencia de la sociedad.” [We are a bilingual educational institution founded in 1993. We focus in a modern and innovative education for the development of the multiculturalism for our diversity of languages, ecological awareness, and a system of multimodal teaching, supported in the use of technology for learning and raising human beings with integrity and human sensibility for the coexistence of society.] (para.1)

Regarding the mission of the school,

“Brindar a la sociedad global ciudadanos con sensibilidad humana, mediante una formación educativa integral, a través de un enfoque humanista y socio constructivista, potenciando habilidades y competencias que le permitan asumir de manera interdisciplinaria y responsable los retos del siglo XXI”. [Offer to the global society citizens with human sensibility, through a comprehensive educational training, across a humanistic and social development approach, enhancing abilities and competences that

allow you to take on the challenges of the 21st century in an interdisciplinary and responsible manner.] (New Hope Bilingual School, 2021, para.2)

As the vision of New Hope Bilingual School,

Nueva Esperanza se visualiza como una institución líder, pionera e innovadora en metodologías de enseñanza y tecnologías aplicadas para el desarrollo sostenible, en la formación de seres humanos con valores potenciando las competencias para su integración a la sociedad como gestores de cambio. [New Hope visualizes as a leader institution, pioneer and innovative in teaching methodologies and applied technologies for the sustainable development in the raising of human beings with values enhancing skills for their integration into society as turnaround managers.] (New Hope Bilingual School, 2021, para.3)

New Hope is characterized by its values, which encompass excellence, respect, responsibility, solidarity, and freedom. These values allow them to be tolerant towards people and patriotic symbols. Also, it commits to accomplish academic compromises on time. It provides empathy towards others, building in this way healthy relationships. Lastly, it does everything with clarity, getting better every time. (New Hope Bilingual School, 2021, para.4)

2.2 THEORETICAL AND CONCEPTUAL CONTEXT

2.2.1 Artificial Intelligence and Its Characteristics

Artificial Intelligence is often abbreviated as AI, and it is part of the field of computer science. AI takes into consideration technology, systems, software, computers, among others. It is considered technology that can perform tasks a human being could do. It can be from a simple

to a more complex task. This new technology has become well-known all over the world. For this reason, it is important to get a wider view on this matter.

Artificial intelligence has been invented since the last century, and from this time has been in constant use and update. According to Manning (2020), “a term coined by emeritus Stanford Professor John McCarthy in 1955, was defined by him as ‘the science and engineering of making intelligent machines’” (p.1). This was the first definition granted to this concept. His eagerness to know about AI started in 1948, and that is why he came up with the term. Even though this concept has been known for a few years now, until these days people are really considering it. The population is getting familiar with AI and the new acquisitions have people more invested in the topic.

Additionally, since nowadays the term is widely known, the definitions have evolved from McCarthy. The definition has extended to a more specific aspect such as that “artificial intelligence refers to the use of computers to do things that normally require human intelligence” (Cai, et al., 2021, p.4). There have been many authors who changed the definition depending on the field they needed. Actually, AI can be defined in many ways, but it depends on the subject and topic.

Significantly, AI has many characteristics and aspects to consider when talking about this term. In this case, AI is used to simulate human cognitive functions. However, they can do other things since they have diverse algorithms that allow them to increase their knowledge and performance. This software is designed to predict, provide answers, facilitate, and interact with humans. In the same way, AI can work as a disadvantage in many situations. This technology has rapidly increased, and it has challenged humans in various ways.

Also, AI has an important role in diverse fields such as healthcare, business, education, transportation, economic development, politics, etc. It can open a wide range of opportunities of many types. In fact, “AI systems are undoubtedly very useful. As the world becomes more complex, we need to leverage our human resources and high-quality computer systems help” (Mijwel, 2015, p.3). It is new technology that has come to stay, and it is a reality that human beings are facing in the present time.

As a result, the software is adaptable and practical for many tasks. It can be configured to do what is needed. AI machines can help people have different views and perspectives and contribute to a lot of aspects. Technology is advancing every day, and AI is the new innovation in this case.

2.2.2 History of AI

Even though Artificial Intelligence seems to be something that started only a couple of years ago, it has existed time before. However, with the release of new AI software, it has recently gained acknowledgement. In fact, AI started in the 20th century with Turing.

Alan Turing, a young British polymath who explored the mathematical possibility of artificial intelligence. Turing suggested that humans use available information as well as reason in order to solve problems and make decisions, so why can't machines do the same thing? This was the logical framework of his 1950 paper, *Computing Machinery and Intelligence* in which he discussed how to build intelligent machines and how to test their intelligence. (Anyoha, 2017, para.1)

Turing was one of the first pioneers of AI, considering him as the founding father of AI. Actually, he focused his work on machines, developing in this way, the universal machine. This

machine was capable of solving problems. Besides, he had important participation in modern cognitive science. According to Copeland (2023), “he was a leading early exponent of the hypothesis that the human brain is in large part a digital computing machine” (para.8). For this reason, he was a very curious man who then became well-known for the Turing test, which had to do with computers and artificial thinking.

In 1956, it was held the first conference regarding this topic. Marvin Minsky was positive about AI development. For this reason, he actually published a book. He was also a really important piece in the field of computer science. Fedde (2016) describes how Minsky thought that machines could recreate what the human mind does, such as the functioning (para.5). That is why his work shaped considerably the field of AI.

Also, another person that had a lot of influence in this field was John McCarthy, which as mentioned before proposed the concept of AI, but besides that in 1957 he developed a program. “LISP is a language that allows you to create flexible programs that represent basic operations with list structure” (Mijwel, 2015, p.2).

For instance, since 1956, which was first introduced the concept of artificial intelligence until the present time, the necessity to explore more about the topic was less for a period of time. This time was called the Dark Period for Artificial Intelligence. It was between 1965 to 1970 when the topic did not receive many investigations of this matter.

Since AI was invented, it has risen rapidly, and it is constantly changing. AI is evolving more and more; new studies are being done in this field. In fact, there is a necessity to update the global population on these topics to see what new things can bring to humanity.

2.2.3 Types of AI Software

Artificial Intelligence is a wide concept and for this reason, it is necessary to specify the different types, models, categories, or levels of it. There are diverse kinds of AI depending on the person's or businesses' interests, needs or requirements.

AI can be subdivided into three levels:

- a. ANI (Artificial Narrow Intelligence): It “is the first level that can make a decade only in one sphere. For example, there's AI that can beat the world chess champion in chess, but that's the only thing it does” (Strelkova, 2017, p.1).
- b. AGI (Artificial General Intelligence): Strelkova (2017) describes this type of intelligence as the one that accomplishes human intelligence level, as reasoning, thinking complex ideas and focusing on critical thinking responses (p.1).
- c. ASI (Artificial Super Intelligence): This is “an intellect that is much smarter than the best human brain in practically every field, including scientific creativity, general wisdom and social skills” (Strelkova, 2017, p.1).

In fact, Artificial Intelligence can be subdivided into different categories depending on the type and usage. Arend Hintze classifies AI into four categories as follows:

- a. Reactive machines: According to Coursera (2023), “AI systems that have no memory and are task specific, meaning that an input always delivers the same output. Machine learning models tend to be reactive machines because they take customer data” (para.5). These machines take data to provide recommendations to users based on likes and dislikes.

- b. Limited Memory Machines: As Coursera (2023) mentions the algorithm tries to replicate what our brains do. As they learn more things, the algorithms improve their knowledge (para.10). The actions these machines do consider information from the past and present.
- c. Theory of Mind: This AI type is not invented at the moment; however, researchers take it as a kind of AI that is going to be part of the near future. If this AI is invented, “they’ll have to be able to understand that each of us have thoughts and feelings and expectations for how we’ll be treated” (Hintze, 2016, para.21). This AI is going to be able to understand human behavior.
- d. Self-awareness: This is the last kind of AI that will be created. This kind is highly related to the Theory of Mind because it is related to consciousness. Hintze (2023) describes it as the awareness to understand the internal feelings of others (para.23). These machines would be aware of what a human wants; however, this discovery is far from being developed since more studies are needed on human brain intelligence.

AI software is constantly advancing, for this reason, there are two kinds of AI that are already in production and taken into consideration. AI is a new technology that is definitely evolving fast. For instance, faster than people think. That is why it is necessary to update on this topic, which is constantly changing and evolving.

2.3 ProWritingAid as a Tool for Writing

The main tool used for this investigation is ProWritingAid AI software. This is a free tool that can be found on the internet by searching <https://prowritingaid.com/>. It is a tool that can be used by teachers and students.

This program gives an evaluation and score of a text based on many writing aspects such as grammar, spelling, style, overused words, or readability. It is competent to check any

misuse of words or sentences as it provides the error evaluation or correction in many linguistic properties. (Astika, 2019, p.1354)

It is considered artificial intelligence software to aid in the writing process. With the implementation of ProWritingAid people in their learning can use this tool to improve their writing. It can work for students, teachers, writers, bloggers, professionals, among other people. The goal of this tool is to identify and correct grammar and spelling errors, as well as style, clarity, coherence, and other writing improvement aspects.

ProWritingAid is used for a wide range of writings such as academic, projects, certified documents, blogs and even for social media. In fact, it can be used as an app or directly from the browser. The most satisfying aspect is that the basic features are accessible for free; however, for advanced features it can be used the premium version. According to Astika (2019), “ProWritingAid is competent in generating all of them in a very short amount of time. The program is capable of enhancing the students’ writing quality in terms of its accuracy on grammar, spelling, etc.” (p.1354). The advantage of this tool is that it provides what the person needs in seconds, granting accurate results needed to improve the writing process.

2.3.1 Features and Use of ProWritingAid

ProWritingAid is a very versatile tool that has many features to increase writing improvement. As a result, no matter the goals a writer has, ProWritingAid is an empowering tool in the writing process. The features that ProWritingAid provide are the following:

- a. Grammar: It identifies the mistakes and provides suggestions related to grammatical errors. ProWritingAid (2023) describes it as a verification for overused words, clichés, awkward phrasing, among others. Moreover, it provides grammatical

recommendations as well as an explanation convincing the writer with a reason on why the mistake was wrong in their writing.

- b. Spelling: It recognizes spelling mistakes, giving the user a suggestion on what he/she wanted to say. These errors can be considered a typographical error or an error because of not knowing how to write the word.
- c. Vocabulary: It provides suggestions for enhancing vocabulary and finding better word choices.
- d. Style and Tone: “ProWritingAid can analyze the writing style and tone, offering suggestions to improve it, ensuring the language is appropriate and matches the academic context” (Tsai, 2023, para.24).
- e. Consistency and Clarity: This feature can make the writing longer or shorter, more formal, or informal, even providing more fluency text writing. “The tool analyzes sentence structures, suggesting improvements to enhance clarity and readability” (Tsai, 2023, para.9).
- f. Readability: ProWritingAid gives out the opportunity to make writing engaging and reader friendly. “In academic writing, maintaining a good readability level is essential to effectively convey complex ideas and research findings to both expert and non-expert readers, fostering better comprehension and engagement” (Tsai, 2023, para.15).
- g. Plagiarism Checker: ProWritingAid (2023) describes that it has a plagiarism checker. It checks the work by comparing it to data base from online sources.

As mentioned before, ProWritingAid has many features users can take advantage of for free. It is a helpful tool that can give people the opportunity to enhance their writing. “Pro

Writing Aid (PWA) website provides a text editing tool which, in addition to the regular spell-checking and other grammar tools, checks the entered content for usage of vague or abstract words, alliteration analysis, and more” (Soleimani & Moqimi, 2023, p.137). It is a tool that is easy to access, free and with many recommendations for the writing process to be effective.

2.4 Scaffolding Strategies

There are different techniques that educators can implement in their classes to assist and teach students. One of these strategies is Scaffolding. These are strategies used to support learners in their goals. In fact, they are very important because they help the student construct their knowledge step by step. Actually, scaffolding can make the students learning achievement more pleasant and helpful.

Scaffolding is a strategy that appeared many years ago and it is used by many teachers nowadays. According to Gonulal & Loewen (2018) as cited by Wood et al. (1976), “scaffolding referred to a form of just-in-time adult assistance ‘that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts’” (p.1). This is considered an instructional technique that helps support students in tasks that may be difficult. It helps students acquire new knowledge and develop skills. Also, it provides students with the necessary tools to achieve learning goals. Indeed, it helps pupils with what they already know and what they will learn.

However, since scaffolding is a strategy that has been developed many years ago, it is related with Vygotsky’s theory of the Zone of Proximal Development (ZPD). They are related since both of them are focused on progress. Gonulal & Loewen (2018) describe this as a way to help the student be a self-regulated person responsible for their learning (p.2).

Scaffolding can be understood as a support for the learner. The goal of this strategy is to build students with confidence in the educational environment, trying to promote independence. As a matter of fact, it is a way to foster deep learning and problem-solving skills.

2.4.1 Characteristics of Scaffolding

Scaffolding has lots of aspects that are important to consider when using this strategy. According to Abdul-Majeed & Muhammad (2015) as cited by Sukyadi & Hasanah (2013), “Scaffolding is defined as the strategy used by the teachers to facilitate learners' transition from assisted to independent performance” (p.94). It means that the teacher functions as a facilitator. In this strategy, learners are engaged to be aware and conscious of their own knowledge.

One of the major characteristics scaffolding has, is that it is adjustable for any subject, activity, or necessity. For instance, teachers can modify the learners' outcomes regarding their necessities. The major idea of this strategy is to create a learning environment captivating for learners. This is a great strategy to implement with students who are struggling in a certain topic. With the implementation of scaffolding, students feel supported and accompanied.

With scaffolding, learners can feel more confidence in the classroom, creating a wonderful and successful setting for themselves. “Through scaffolding, teaching and learning methods have become more successful and fascinating as students learned and observed what they learn in classrooms through doing it” (Rahma, et al., 2020, p.59). Besides, students experience the learning by the doing methodology because they are exposed to this matter.

Another major advantage of using scaffolding is that it develops in students a sense of thinking and collaboration. Kesuma & Rozimela (2021) mention that scaffolding is where

cognitive aspects are developed (p.52). For this reason, it can be seen as a strategy to enhance critical thinking and problem-solving skills.

Scaffolding is more than just helping pupils; it provides feedback so students can learn and achieve the required goals. During this strategy the teacher provides guidance and feedback to the students' work, offering major suggestions in this way. Feedback shares essential information, a suggestion, or a highlight of what the students did excellently.

Though, this model has lots of aspects to consider when using it. According to Rahmat, et al. (2021), "The common model for understanding and describing scaffolding involves flexibility, fading, and assigning responsibility" (p.54). This model shows flexibility because it can be adapted to any context. Besides, it can also be used in any subject and to reinforce several skills. Also, fading is an integral part of scaffolding since it gives a steady reduction of support building in the learner independence. When increasing independence, the learner becomes more capable of achieving their goals. Scaffolding builds competence and autonomy in the student. Finally, responsibility is increased because the students are focused on completing the task by themselves. It provides a sense of management through the students' participation.

2.4.2 Scaffolding in the Class Environment

The implementation of Scaffolding in the classroom is definitely a game changer for students. Teachers usually use different strategies and methodologies in the class, as scaffolding is one of them.

This strategy is as crucial as others, but what makes it more striking? What makes this strategy different from others is that it provides greater benefits for students, rather than disadvantages. One of the most important aspects to consider when applying this in the class is

that it is a step-by-step process. It provides in this way less confusion for the learner. It has been shown that scaffolding decreases confusion when learning a new topic. This strategy can be applied to any age range. Abdul (2015) describes the importance of scaffolding as a reduction of surprise in students and a decrease of uncertainty (p.97). Lowering the appearance of problems with not understanding in the classroom. If these aspects are less, the difficulties are deleted, and the learning is maximized to the highest level.

In order to implement this strategy and have effective results, the teacher must know the capabilities of the students. Zurek et al. (2014) mention that it is important and necessary to understand and have knowledge of the strengths and weaknesses of a child. This is useful to anticipate the opportunities in effective learning situations (p.48).

When using Scaffolding, there are diverse stages which can be implemented. These are 1) modeling, 2) bridging, 3) contextualization text, 4) scheme 5) text representation and 6) developing metacognition.

- 1) Modeling: According to Curletto (2022), “This is the first stage of scaffolding. The teacher explains and shows the new concept” (para.7). In this stage, the teacher shows students what they are supposed to do and the expectations of the task.
- 2) Bridging: This one lays on the fact that students already have knowledge of something. From that concept, students start building or “bridging” what they already know to what they are seeking to learn.
- 3) Schema Building: Abdul (2015) defines this stage as a cluster. It is a cluster between how knowledge and understanding are organized (p.97). It is essential to help students see the connections between various concepts and make learning more pleasurable.

- 4) Developing Metacognition: Metacognition is the “individual’s ability to plan, monitor, evaluate, and make changes to their own learning behaviors in order to confront challenges more effectively” (Sword, 2021, para.3). It refers to the ability of a student to manage their thinking. In this way, creating a more effective learning tool.

As shown before, Scaffolding is a strategy that allows students to think and learn in a gradual mode. Also, it is a strategy that can benefit the student in their learning process offering lots of opportunities and chances to build their learning experience.

2.5 AI in the Writing Skill in Academic Settings

The use of AI software in the writing process has increased due to the high appearance of new technological tools. Since writing skills are part of a person’s life, it is definitely necessary to improve them. Writing skills are the hardest to acquire since the person needs to manage a lot of vocabulary, grammar structures, coherence, among others. Besides, writing invests a lot of time, so it can be frustrating for people to invest much time in this process.

With the facilities people can find in today’s world, AI is a tool that can increase the process of writing. According to Nur (2023), “Artificial intelligence technology can understand human natural language and produce written text that is similar to human creation” (p.52). AI software is technology that is very advanced, for example there are many tools that can be part of understanding many other things.

In writing skills, AI can be a double-edged sword because with the advancements of AI students can ask the program to create them the writing task. With the correct use and implementation of AI students may use these tools for their benefit. Every person has their own

way of writing. Even though AI writes as a human being, it can be foreseen that it was written by an AI machine.

In academic environments, the integration of Artificial Intelligence (AI) has revolutionized the way individuals approach the development of writing skills. AI tools, such as language models and grammar checkers, provide assistance to students and scholars in refining their written work. These tools analyze text for grammatical errors, suggestions for enhancing clarity, and even providing style improvements. The accessibility of AI assistants promotes a collaborative relationship between technology and learning, where students can develop an environment to upgrade their writing skills.

Moreover, AI in the writing skill contributes to efficiency and time management with the ability to proofread and offer constructive feedback. Feedback is the most important lesson learners learn from using AI tools because they have suggestions for free. According to Fedde (2016), “Learners receive recommendations in a second. They can improve their writing skills fostering their way of writing” (p.8). AI tools allow writers to focus more on the content and structure of their work. AI not only enhances the quality of writing, but also empowers individuals to meet academic requirements more effectively.

It is essential to acknowledge the ethical considerations surrounding AI in writing. While these tools offer valuable assistance, there is a risk of over-reliance. In conclusion, AI in writing is a powerful ally that provides great insights, but its implementation has to be approached thoughtfully to preserve the essential aspects of human creativity and learning.

2.5.1 Coherence of Ideas as part of Writing

Coherence of ideas is a fundamental aspect of writing to make people understand what you write. This element elevates the quality and impact of a written piece. According to Dergaa, et al. (2023), “Coherence refers to the logical and orderly connection of ideas within a text, ensuring that thoughts flow seamlessly from one to another” (p.3). When ideas are coherent, the reader can easily follow the writer's narrative, resulting in a more engaging and comprehensible piece of writing.

The consistent nature of ideas within a written work enhances the overall readability of the text. Well-structured sentences and paragraphs that build upon each other create a sense of unity. According to Rico (2014) as cited in Fareed, Ashraf, & et al. (2016), “an incoherent text fails to communicate ideas which causes lack of confidence in learners even if they have mastered syntactic, lexical, and grammatical command over text composition” (p.83). Coherence allows the writer to convey complex concepts in a manner that is digestible for the audience. It fosters a connection between the author and the reader, facilitating a smoother transfer of information and ensuring that the intended message is not lost or misunderstood.

Writing is a careful consideration of the organization of ideas. The use of transitions and the sequencing of ideas is highly necessary when writing. It requires the writer to establish clear relationships between sentences and paragraphs, reinforcing the overarching structure of the piece. Ultimately, coherence of ideas is not merely a technical aspect of writing, but a critical element that enhances the effectiveness and impact of communication.

Furthermore, a well-organized piece follows a logical progression of ideas. It is very important for the reader to be able to follow an order where writing makes sense.

In an academic essay, a clear thesis statement in the introduction sets the stage for the subsequent paragraphs, each building upon the last to support and develop the main idea. Transitions between sections serve as signposts, guiding the reader through the writer's thought process. (Seo, et al., 2021, p.50)

One of the main challenges writers face is maintaining coherence when dealing with complex or topics they do not know very well. In such cases, it becomes essential to employ strategies that tie together the ideas. This might involve the use of sentences that can work as a hook. In these sentences, readers feel included throughout the lecture. Additionally, the effective use of topic sentences and supporting details within paragraphs helps to establish a clear order of ideas.

The ability to express ideas coherently is often associated with higher order thinking skills. “It requires writers to synthesize information, draw connections between concepts, and present a well-structured and cohesive narrative” (Fedde, 2023, p.5). The development of coherence in writing is not only an essential skill for effective communication but also a marker of intellectual maturity. Writers who master coherence can guide the readers through difficult subjects with clarity, establishing themselves as great communicators.

2.6 Uses of AI in Teenagers

Nowadays, adolescents are exposed to technology to a large amount, so it is a fact that new technology is arising, and they are already using it without a doubt. Every app, tool, software, or program that is new, they are already researching on how to use it, what it can do and how they can apply it for their life.

AI plays a significant role in their living such as in the social interaction, academic aspects, entertainment, among others. Moreover, teenagers are already using Artificial Intelligence. Social media shows teenagers new acquisitions in technology. They try every app for leisure activities, schoolwork and for other things. Teenagers can use AI for their social media, likes and entertainment. AI is integrated everywhere people can imagine.

It is necessary to list how students, especially teenagers, can benefit or detriment their education, life, and background. “The integration of generative AI in education is an exciting area of research that has the potential to revolutionize the way we teach and learn” (Tzoneva, n.d., p.2). For this reason, the implementation of AI is a way human beings can upgrade on topics of interest.

2.6.1 Students’ Perceptions of AI

When using Artificial Intelligence in the classroom, students can see it as a tool to use and reinforce their studies. AI has lots of uses and not every teacher or student thinks the same. In fact, the perceptions of AI can vary based on the technological use of the person, how much he/she likes technology and the knowledge of it. Some students can see AI as an advantage in the educational setting, having in this way excitement and eagerness to learn. They can have the concept of AI as an amazing tool used for greater advantage. However, some students may see it as a worrying situation due to many factors. One issue that can be very common is the concerns regarding privacy. Students may not like the use of AI because it can take their potential, creativity, and opinion away.

The experiences individuals have had can influence the way they conceive AI. The use of AI is something new that is being used nowadays.

For the students, this strategy allowed them to have the best of both worlds; to learn, revise, and improve their descriptive paragraphs from ProWritingAid and teacher feedback. Through ProWritingAid, the students can learn and fix their errors with the help of the explanation given by the program. Especially in reference to the students' errors in grammar, vocabulary, or spelling. (Astika, et al., 2019, p.1361)

In this case, the AI ProWritingAid gives the students the opportunity to learn on their own and not depend so much on the teacher. Also, it provides the students with general corrections needed to have better writing skills. The students view the opportunity to use AI as a way to develop beneficial writing skills for their life.

As a matter of fact, AI is not for everyone and not every student likes to use it. According to Astika, et al. (2019), “there were students who failed to gain the usefulness of the program because of their low English level or proficiency” (p.1361). The AI software can provide concerns to students. In this case, AI programs are more for students who have a higher English level to understand what the software provides. It can be confusing for students that do not have a high level of understanding of English, and it can impact on their learning experiences.

AI is mostly seen by students as a tool to enhance their learning. “AI applications such as those mentioned here are only as good as their perceived usefulness by students” (Zou, et al., 2020, p.440). The perceptions teenagers have on AI is based on the acquisition of new technological tools involved in their learning. The necessity of using technology in the class nowadays is a most and a really useful tool to use with teenagers.

2.6.2 Benefits of AI in Secondary Education

AI in secondary education is very important because there are tools that are being shown nowadays to students. Besides, AI is a must to use in the classroom because teenagers already have access to these sites. Teachers are the ones in charge of teaching students the correct implementation of these new AI tools.

The integration of AI in secondary education can provide the students with a positive and beneficial environment if it is used correctly. One greater benefit of AI is that there are many AI tutors that can help students having trouble understanding certain topics. According to Tzoneva (n.d.), “ChatGPT has also the potential to assist students with learning (i.e., answering questions, summarizing information) and assessment (i.e., providing feedback, exam preparation)” (p.1). It can work as a tool that is literally at the disposition of whoever needs it.

Another benefit is that it provides answers to anything a person asks. It gives an answer in seconds which makes it more efficient for students in the learning process. This aspect is of a lot of use since learners can access AI with just one click and can get their answers right away.

The benefits students can get with these AI tools are countless. According to Atlas (2023) as cited by Chan & Hu (2023), “Text-to-text AI generators can provide writing assistance to students, especially non-native students, by enabling them to brainstorm ideas and get feedback on their writing through applications such as ChatGPT” (p.2). With AI, students can learn a lot of things and reinforce information they already know. Non-native students can get many benefits since they can receive extra help with AI. Mostly in writing skills, since it is the hardest to acquire, it can help students who do not know many things of a certain language.

Also, AI can summarize information. This can be seen as a disadvantage because it can proportionate a synopsis of a certain reading; however, it can really help students who have learning difficulties to get a clearer view of what a certain text was about.

AI can provide diverse opportunities to students, mostly in high school. It is just a matter of teaching the correct use of these tools. At the end, students have the access, so why not teach them the way in which they can benefit? AI has many pros, and it is necessary to search for them.

2.6.3 Disadvantages of AI in Secondary Education

Every technological tool can really help students with many aspects, as facilitating and learning in some way. For instance, “While studies have shown the positive effects of AI chatbots on students' learning outcomes, it is important to consider the concerns and challenges associated with their use” (Tzoneva, n.d, p.2). It is necessary to analyze the disadvantages as well to see if it is worth using AI in secondary education.

AI is as interesting as it sounds and all the amazing features it has, but it has issues as well. One of the major inconveniences' users deal with is the user safety or privacy. People are having trouble with sharing a lot of information with AI platforms because they think it is not secure. These programs ask for all the information to have data from the user to create the algorithm based on that. Additionally, AI can misuse this information for other purposes not related to the program.

Actually, according to Chan & Hu (2023), “there have been challenges about the limitations of GenAI and issues related to ethics, plagiarism, and academic integrity” (p.2). For this reason, it is a big concern for students, teachers, and parents. If students are going to use

these programs, they should know how to use them. This is mostly the wider disadvantage of implementing AI in education. Students can have issues, and this is why the necessity to educate learners is rising.

The AI programs that exist are for many purposes, not only academic. That is why, the AI software that is exclusively used for generating or editing images can be used in the wrong way. AI can work as a double-edged weapon, which is necessary to learn how to apply it correctly and for the best purposes.

Other disadvantages of AI are that “human jobs are affected, creativity is dependent upon a programmer, lacks the human touch, the younger generation becomes lazy and technological dependency increased” (Khazode & Sarode, 2020, p.34). With this, it can be foreseen that AI can damage human integrity indirectly. People can become dependent on AI and of course it is not the idea. Besides, it mentions that the young population gets lazy. With all the technological devices, laziness is promoted. Actually, why are students going to put effort into their schoolwork if AI can do everything? This is one of the major concerns that are part of the new reality. Also, creativity is compromised. Creativity is “the ability to make or otherwise bring into existence something new” (Kerr, 2024, para.1). Every human being has its own way of thinking and creating something from scratch. In this way, it can be evident the many disadvantages AI can have.

CHAPTER III: METHODOLOGICAL FRAMEWORK

In this chapter, the methodological part of the investigation is presented. This part shows in detail aspects concerning the population, subjects, sources of information, type of research, among others.

For instance, at first the information is regarding the research in general. It talks about the purpose, the temporal dimension, the different kinds of frameworks, the nature and character of the research. It provides very precise information concerning these aspects.

Then, the information is regarding the subjects of study. This is one of the most important parts of the chapter because the population is shown and presented as a whole. The sources of information give credibility to the research because they show the most important findings of the investigation. There is first, second and third hand sources of information.

Lastly, this chapter presents general information about the techniques and instruments that are used in the investigation process. It shows which instruments are used and the objective of each of them. Besides, with the implementation of them, the results of the investigation process will be gathered. Also, the variables are shown regarding each of the objectives of the current investigation. In addition, a conceptual, operational, and instrumental definition is provided in this chapter.

3.1 Type of research

3.1.1 Purpose (Applied)

The purpose of the research is applied because it seeks to solve a problem in society. It also gathers information, uses strategies and instruments to get results on a specific circumstance. According to Baimyrzaeva (2018), “A research that takes place in an everyday

context to solve specific problems of individuals, organizations, and/or industries is called “applied research” (p.6). It generates answers to problems and proves important aspects.

This type of research looks for expanding knowledge and understanding the implications it presents. It has a direct focus and applies practical phases to gather the information. This research provides conclusions and generates a process to follow. This research is usually used in diverse fields, which is the case of this investigation.

3.1.2 Temporal dimension (Transversal)

In an investigation, there are two types of temporal dimensions: longitudinal and transversal. For this reason, a longitudinal dimension is “a type of observational and correlational study that involves monitoring a population over an extended period of time. It allows researchers to track changes and developments in the subjects over time” (Simkus, 2023, para.1). In the longitudinal dimension, it considers the time invested and the historical changes.

On the other hand, the transversal dimension “is defined as an observational research study where data is collected as a whole to study a population at a single point in time to examine the relationship between variables of interest” (Bhat, n.d., para.1). In the transversal dimension, every aspect is analyzed in detail, and it is in short term.

For this reason, this research is transversal because it studies a specific population in a certain period of time. Also, it only considers the present, not what happened before the beginning of the investigation process. It is not longitudinal, because it is not going to be for a long period of time, and it is not going to consider changes in history.

3.1.3 Framework (Mega-Macro-Micro)

A study can have three types of frameworks such as mega, macro and micro depending on the population of study. For the present investigation all the types of frameworks are considered. The mega framework is the largest population it is contemplated. In this case, the mega framework for this study is the province of Heredia since it is in this area where the research is taking place. Besides, the macro framework is a smaller unit compared to the mega. The macro framework is Santa Bárbara because it is a canton of the province of Heredia. Lastly and most importantly, the micro framework is the smallest unit of study. The micro framework for this study is the eleventh-grade students from New Hope Bilingual School since it is the institution where the investigation is taking place.

3.1.4 Hypothesis (Independent-Dependent)

In the present investigation a hypothesis is proposed, where there is an independent and dependent variable. Besides, a conceptual definition is given to the most accurate words of the hypothesis.

Independent Variable: ProWritingAid AI software is the independent variable because it is going to be applied to the students.

Dependent Variable: Coherence of ideas in writing.

Hypothesis: Eleventh grade students from New Hope Bilingual School will improve their coherence of ideas in writing by using ProWritingAid AI software.

Conceptual Definitions:

1. Coherence: “a clear relationship between parts, esp. in a work of literature or art”

(Cambridge Dictionary, 2023, para.2).

2. Writing: “the act or art of forming visible letters or characters” (Merriam-Webster, 2023, para.2).
3. ProWritingAid: “ProWritingAid is a style and grammar checker that helps users eliminate errors and choose the best words in their writing” (Osmond, n.d., para.4).
4. AI: AI is an abbreviation for Artificial Intelligence. According to Copeland (2023), “Artificial intelligence is the ability of a computer or computer-controlled robot to perform tasks that are commonly associated with the intellectual processes characteristic of humans, such as the ability to reason” (para.2).
5. Software: “the entire set of programs, procedures, and related documentation associated with a mechanical or electronic system and especially a computer system” (Merriam-Webster, 2023, para.2).

3.1.5 Nature (Mixed)

Regarding the nature of the research, the two natures are predominantly. For this reason, qualitative and quantitative are part of the investigation. According to Mcleod (2023), “Qualitative research is the process of collecting, analyzing, and interpreting non-numerical data, such as language. Qualitative research can be used to understand how an individual subjectively perceives and gives meaning to their social reality” (para.6). In this case, non-numerical data is analyzed and considered in the results. It can contain videos, photos, interviews, and observations. This is basically when the researcher gathers more information that is written or spoken than shown graphically with numbers.

On the other hand, the other type of nature is quantitative. Mcleod (2023) describes quantitative research as numerical data that is analyzed using statistical methods. The goal is to express and measure data in numerical representations. This research is often used to test

hypothesis, identify patterns, and make predictions (para.2). In the quantitative nature everything is focused on numbers and not written information. In this type of research, questionnaires are used and also scales.

In the present study both natures are combined. This shows what is called mixed nature. With both natures part of a research, the information can be more accurate. Besides, the way to gather data can be more assertive.

Mixed methods research requires a purposeful mixing of methods in data collection, data analysis and interpretation of the evidence. The key word is ‘mixed’, as an essential step in the mixed methods approach is data linkage, or integration at an appropriate stage in the research process. (Shorten & Smith, 2017, p.74)

3.1.6 Character

The research has three types of character which are evident for the type of study. The first type is exploratory. It is exploratory due to the topic not being well known. George (2021) describes exploratory research as a methodology which considers research questions not studied before (para.1). Besides, exploratory research explores what is happening with a certain phenomenon. It provides new information, which can be used and studied.

Also, descriptive research is evident because it explains characteristics using statistics and tables. According to Sirisilla (2023), “This type of research provides a detailed and accurate picture of the characteristics and behaviors of a particular population or subject” (para.1). This type of research gains a deeper understanding of a certain issue of interest.

Additionally, the other type of study is correlational. It associates variables and their relationship between concepts or categories. “A correlational study is a type of research design

that looks at the relationships between two or more variables. Correlational studies are non-experimental, which means that the experimenter does not manipulate or control any of the variables” (Cherry, 2023, para.1). In the correlational study, there are independent and dependent variables, which are compared and analyzed.

3.2 Subjects and Sources of Information

3.2.1 Units of Analysis (objects or subjects of study)

For this investigation, the population of the study is specified, and the individuals are categorized. There are two ways to classify the subjects, which are the universe and the sample.

First of all, it is necessary to define the universe. According to Joshi (2020), “Universe is a set of entire units of objects (physical things), or subjects (human being) selected for the study” (p.4). For this investigation, the universe is the eleventh-grade students from New Hope Bilingual School. In this level, there are 100 students. In fact, the universe is not possible to be studied as a whole. For this reason, it is taken a sample. A sample is the choice that is made based on the universe.

Sample is single, independent unit of an object or a subject selected for study. It is the portion of the population that represents the population. It is a set of units of objects (physical things), or subjects (human beings) selected from population. Thus, it is a subset of universe and population. (Joshi, 2020, p.4)

In this investigation, from all the students from New Hope Bilingual School, the eleventh-grade class 11-2 is the sample for this study. In this class, there are 28 students from which 11 are men and 17 are women. Every student from this class is going to be part of the investigation process, considering both genders.

3.2.2 Firsthand Sources

Table 1

Firsthand Sources Used in the Research Process

Author or Authors	University or Organization	Country	Year
Zulfa, S., Sari, R., Nuruddin, D., Hamid, F. & Defianty, M.	Universitas Islam Negeri Syarif Hidayatullah Jakarta	Indonesia	2023
Seo, K., Tang, J., Roll, I., Fels, S., & Yoon, D.	Seoul National University of Science and Technology	Korea	2021
Xie-Li, D., & Arias Mendez, E.	Instituto Tecnológico de Costa Rica	Costa Rica	2023

Source: Developed by Adriana Gutiérrez Campos (2023)

3.2.3 Secondhand Sources

Table 2

Secondhand Sources Used in the Research Process

Author or Authors	Book Title	Year
Nasution, A. & Fatimah, S.	The use of ProWritingAid web in editing students writing	2018
Fedde, C.	How Marvin Minsky revolutionized artificial intelligence	2016
Ariyanto, M. S. A., Mukminatien, N., & Tresnadewi, S.	Students' and Teacher's Perceptions towards the Implementation of ProWritingAid and Teacher Feedback	2019
Nur, T.	Artificial intelligence (AI) technology in OpenAI ChatGPT application: A review of ChatGPT in writing English essay.	2023
Utami, S. P.T., & Winarni, R.	Utilization of artificial intelligence technology in an academic writing class: How do Indonesian students perceive?	2023

Source: Developed by Adriana Gutiérrez Campos (2023)

3.2.3 Thirdhand Sources

Table 3

Thirdhand Sources Used in the Research Process

Author	Article	Year
Dergaa I., Chamari K., Zmijewski P. & Ben Saad H.	From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing	2023
Abdul-Majeed, M. R., & Muhammad, N. M.	The effect of using scaffolding strategies on EFL students' reading comprehension achievement	2015
Agrawal, A., Gans, J., Goldfarb, A.	What to Expect from Artificial Intelligence	2017
Copeland, B.	Artificial Intelligence	2023
Coursera.	4 Types of AI: Getting to Know Artificial Intelligence	2023

Source: Developed by Adriana Gutiérrez Campos (2023)

3.3 Sampling

3.3.1 Population

The population of the study are the students from New Hope Bilingual School, which at the same time constitute the universe. Nonetheless, the population of this institution is in great scale. For this reason, a sample is taken to ensure the finishing of the investigation process.

3.3.2 Sample

To make the investigation process more accessible for the researcher, a sample is taken. From all the population the sample chosen was the eleventh-grade class 11-2, due to they are the oldest students of the institution and with this population the results can be more accurate concerning the complexity of the research topic.

3.3.3 Non-Probabilistic

The sample for this investigation is non-probabilistic because the individuals were chosen based on the grade they are studying and their age. According to McCombes (2019), “Non-probability sampling involves non-random selection based on convenience or other criteria, allowing you to easily collect data” (para.4). This sampling was done by convenience to apply the research on the eleventh-grade students, specifically on the 11-2 class.

3.4 Techniques and Instruments

In order to gather the results and verify the impact of the research, instruments are important to collect data. This is essential to show the results and draw conclusions. The instruments mainly used are questionnaires, observations, and Likert scales.

Before applying the instruments to gather the information needed for the investigation, a general observation is done. The goal of this first observation is to examine the 11-2 group to gather general information concerning the students, arrangement of the class, methodologies, behaviors, dynamics, among others. This, in order to have a clear understanding of the subjects of study of the present research.

The first instrument is related to the first specific objective, which is to establish the appropriate use of ProWritingAid AI software when developing writing tasks. In order to achieve

this objective a pretest is applied. Through this instrument (Questionnaire I), there are going to be shown the results gotten after the students received a workshop with the researcher. The workshop is about the implementation of ProWritingAid AI software in writing. After the workshop is done, a paragraph with mistakes is going to be provided to the students to let them experience how the software works on their own. Then, the pretest (Questionnaire I) is given to the students to establish their knowledge of this software. The aim of this instrument is to gather data that the subjects already know to show the progress along the appliance of the research. This first step is taken a duration of 3 lessons, to get to explore the software.

The second instrument is related to the second specific objective, which is to identify the proper use of ProWritingAid as an AI software that enhances writing skills and coherence during the Literature & Language lessons. In order to prove this aspect, an observation will be applied to the students where the implementation of ProWritingAid is going to be determined. In this step, students are required to write a paragraph in simple present about a free topic. Then, students must exchange the paragraph with a classmate to correct it. After that, they use ProWritingAid and explain the feedback to their classmate. Data will be gathered through a checklist, where the researcher observes how students use this AI software. Aspects such as behavior, use and ease are part of what the researcher observes during the process. This instrument is applied in 2 lessons.

The third instrument used in this investigation is a Likert Scale. This instrument is related to the third specific objective, which is to determine the correct procedure of writing skills and coherence of ideas handling AI software during the English lessons. The idea of applying this type of instrument is to collect the opinion after using ProWritingAid.

Lastly, the fourth instrument is related to the fourth specific objective, which is to examine the effectiveness of ProWritingAid AI software as a tool to enhance mechanics when writing. To achieve this objective and to show a progression in the study a posttest is applied. For this activity, the researcher is going to provide 3 images. The students are going to choose 1 and write about it using simple future. They follow the writing process and then use ProWritingAid to get feedback. This activity is individual and executed in 3 lessons. Through this instrument (Questionnaire II), it is going to be shown the results gotten after the investigation process was applied. The researcher gathers the results and compares them with the pretest applied at the beginning of the research. The aim of this instrument is to gather data that shows the progress along the appliance of the AI software.

3.4.1 Operationalization of Variables

The variables of the present investigation are analyzed and to show the investigation process. Besides, the instruments used to study the subjects and to prove validity to the research problem.

In the chart it can be evident the general objective of the investigation and specifically the variable for each specific objective. Also, the conceptual definition, an instrumental definition, and an operational definition.

Table 4

TITLE: THE EFFECTIVENESS OF USING PROWRITINGAID AI SOFTWARE WITH SCAFFOLDING STRATEGIES TO DEVELOP COHERENCE OF IDEAS IN WRITING ON ELEVENTH GRADE STUDENTS FROM NEW HOPE BILINGUAL SCHOOL DURING THE I QUARTER 2024

Variables Chart

General Objective: Determine the effectiveness of using ProWritingAid AI software with scaffolding strategies to develop coherence of ideas in writing on eleventh grade students from New Hope Bilingual School during the I quarter 2024.

Specific Objectives	Variable	Conceptual Definition	Instrumental Definition	Operational Definition
Establish the appropriate use of ProWritingAid AI software when developing writing tasks.	The appropriate use of ProWritingAid in writing tasks.	The correct application of an AI software during writing.	Instrument: Questionnaire I Technique: Pretest The questionnaire is directed to students. It is aimed to know the understanding of ProWritingAid AI software after receiving an introductory workshop and experiencing with the software.	In the Questionnaire I, the variable is valid through this instrument if 70% of students mark "Yes" in 70% of the items. It means students have a good impression of ProWritingAid.

<p>Identify the proper use of ProWritingAid as an AI software that enhances writing skills and coherence during the Literature & Language lessons.</p>	<p>The use of ProWritingAid to enhance writing and coherence.</p>	<p>The employment of an AI software to get better at writing and coherence.</p>	<p>Instrument: Checklist Technique: Observation The observation is directed to students. It is aimed to observe the implementation, behavior and use students give to the ProWritingAid AI software.</p>	<p>In the Observation, the variable is valid through this instrument if the researcher marks “Yes” in 70% of the items. It means students use AI software for their writing in an effective way.</p>
<p>Determine the correct procedure of writing skills and coherence of ideas handling AI software during the English lessons.</p>	<p>The procedure of writing skills and coherence of ideas handling AI.</p>	<p>The series of actions in writing and coherence from using AI.</p>	<p>Instrument: Likert Scale The Likert Scale is directed to students. It is aimed to know how the students perceive AI in the writing process.</p>	<p>In the Likert Scale, the variable is valid through this instrument if 70% of students mark “Agree” in 70% of the items. It means students successfully approve on the implementation of ProWritingAid AI.</p>
<p>Examine the effectiveness of ProWritingAid AI software as a tool to enhance mechanics when writing.</p>	<p>The effectiveness of ProWritingAid to enhance mechanics in writing.</p>	<p>The result of an AI successful app in mechanics.</p>	<p>Instrument: Questionnaire II Technique: Posttest The questionnaire is directed to students. It is aimed to know the effectiveness of</p>	<p>In the Questionnaire II, the variable is valid through this instrument if 70% of students mark “Yes” in 70% of the items. It means students</p>

			ProWritingAid AI software after been working with this tool for certain lessons.	perceive the use of ProWritingAid as a positive outcome for their educational life.
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Source: Developed by Adriana Gutiérrez Campos (2023)

CHAPTER IV: RESULTS AND ANALYSIS OF DATA

In this chapter, the data collected is analyzed and shown graphically. It is necessary to mention that every instrument was made with the intention of fulfilling every specific objective of the investigation. In fact, every piece of information shown in this section is relevant to show the main results of the investigation process and the achievement of it.

In the research, there were used four instruments. The first instrument was Questionnaire I which consisted in gathering information as a pretest. This first data is very important because is the first relationship the participants have with the software.

The second instrument was an observation. Observations are extremely useful because the researcher gets to watch the students cautiously. Even though this instrument is a lot about interpretation, it is necessary to analyze it carefully.

The third instrument was a Likert Scale. This instrument was applied mostly to gather the anonymous opinion of the students regarding the software used in this investigation.

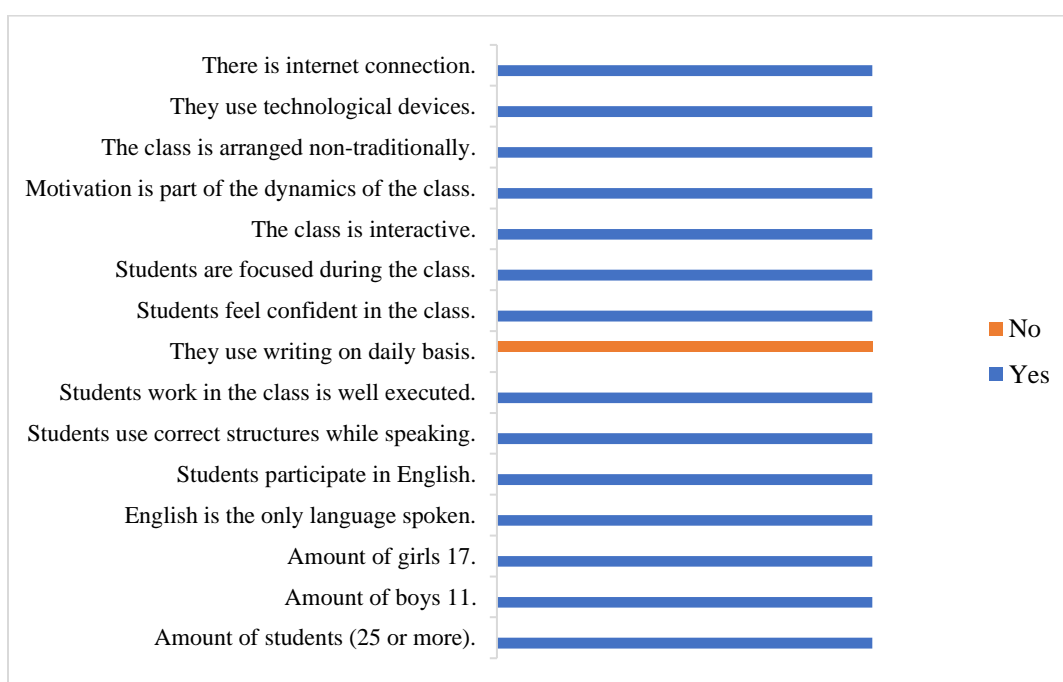
Lastly, the fourth instrument was Questionnaire II which was taken as a posttest. This instrument is necessary at the end of the research because it is the last data taken from the subjects of study. Besides, this instrument can determine the changes students had at the beginning of the investigation and compare them at the end.

4.1 Actual situation diagnostic

4.1.1 Initial Observation

Graph 1

General Information of the 11-2 Class



Source: Developed by Adriana Gutiérrez Campos (2024)

According to the previous graph, it displays the information gathered before the application of the project. This observation was applied to know the group and its behavior in the class. It displays aspects regarding the students and the functioning of the class.

At first, it was analyzed the number of students in the group 11-2. The group consisted of 28 students of which 17 were women and 11 men. This aspect was considered, so the investigation process was more accurate based on gender. In fact, the difference between men and women is 6 students, which is balanced to gather the results.

Then, the use of the English in the class was observed since the project requires a certain English level to use better the AI tool. The students had a high English level, which pointed to good results in the investigation; however, writing is the skill of relevance for this study, and it is not used in a daily basis. In fact, this skill is only practiced once a week, which can be rewarding in the use of AI.

Concerning the class, the class seemed very dynamic and interactive, which meant the students could have a better outcome when the AI tool was going to be applied. The students had a good attitude, and they are used to trying new strategies in class.

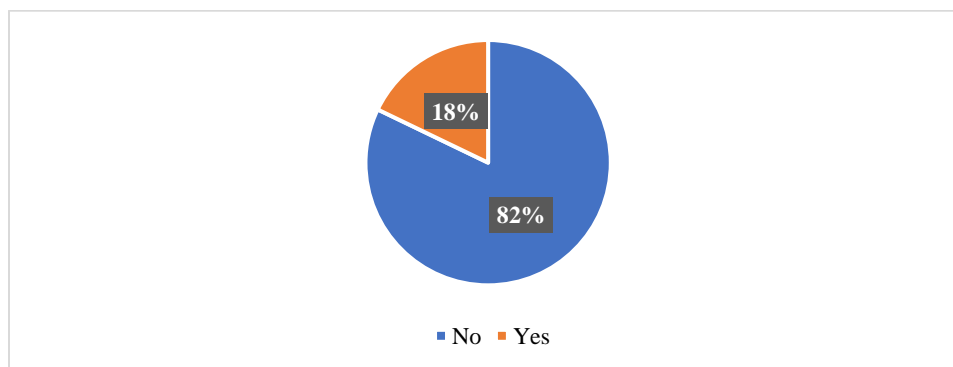
One of the major advantages of this observation, is that it can be evident that technology and most importantly internet is part of their daily basis in the classroom setting. Without technology this investigation could not have been carried out.

As mentioned before, this observation was done to have a better understanding of the group the researcher was going to work with.

4.1.2 Pretest (Questionnaire I)

Graph 2

Use of AI on a Regular Basis

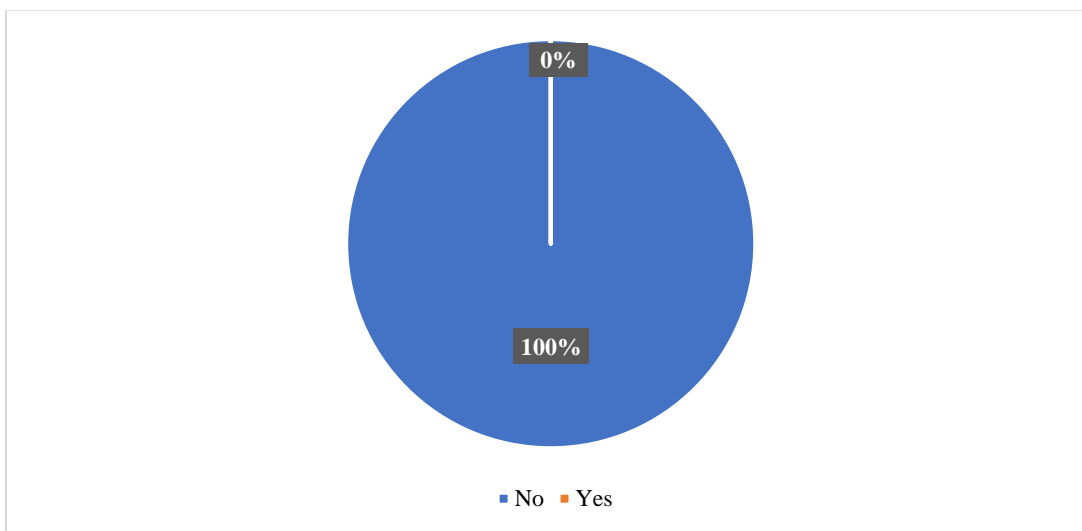


Source: Developed by Adriana Gutiérrez Campos (2024)

In the graph above, it is shown the results gathered concerning the use of AI of the students in a regular basis. Students were asked how regularly they are used to using AI. It can be assured that 82% of the students do not use AI daily, which means the investigation process can be more fulfilling for them. In the same way, 18% of students are used to utilizing AI, but it is less than a quarter of the students. For this reason, even though AI is known nowadays, the eleventh-grade students do not use it frequently.

Graph 3

Knowledge of ProWritingAid

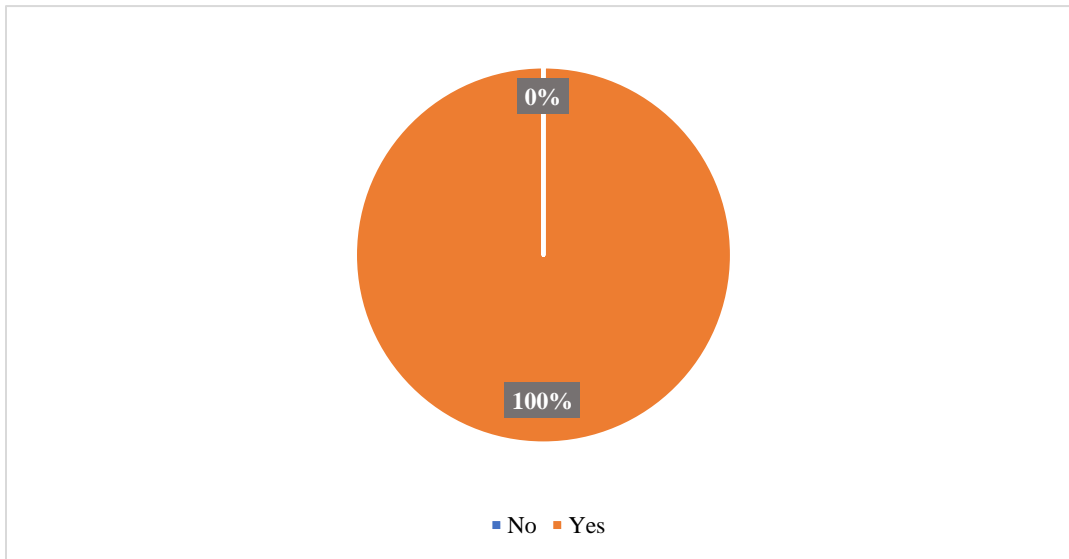


Source: Developed by Adriana Gutiérrez Campos (2024)

According to the graph above, it can be evident that the ProWritingAid AI software has never been used before by the eleventh-grade students. Their first approach was during this investigation. This is due to the fact that this Artificial Intelligence software is not as known as others. As a matter of fact, ProWritingAid has lots of advantages and benefits to share with students.

Graph 4

Suggestions of ProWritingAid



Source: Developed by Adriana Gutiérrez Campos (2024)

Graph 5

Explanation of why the functioning of the suggestions

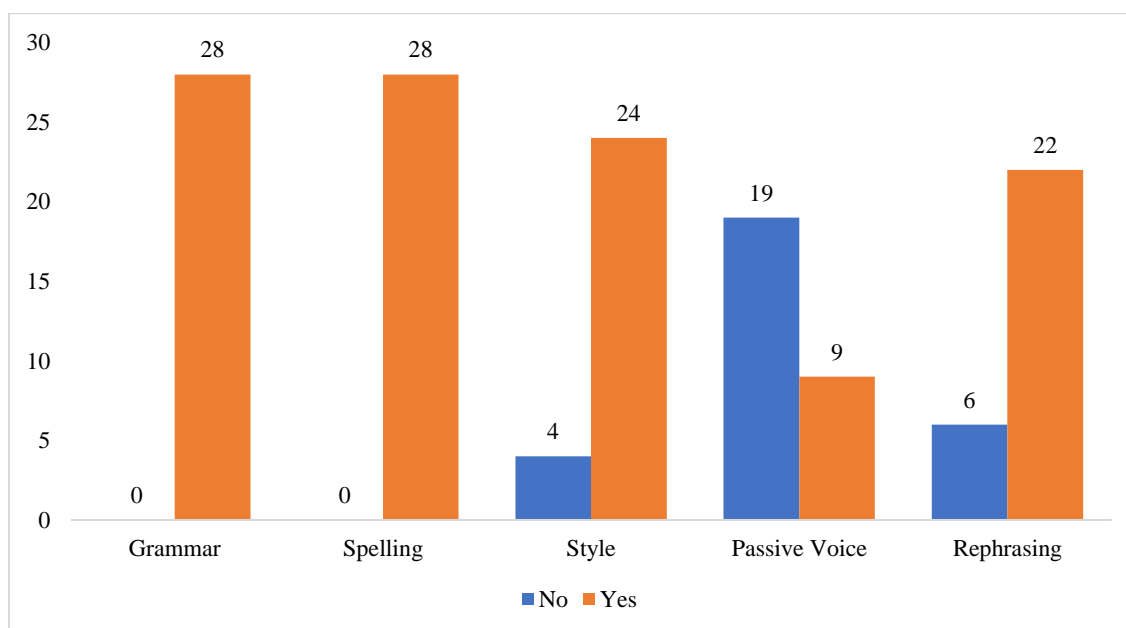


Source: Developed by Adriana Gutiérrez Campos (2024)

According to graphs 4 and 5, the results gathered show the overall experience students had based on the first approach concerning the software. They were asked if the suggestions were assertive and beneficial and 100% of the students agreed with this statement. This answer can be proved because the software gives a certain feedback students need in their writing. In fact, the feedback it provides is very complete, which helps in the writing skill. Also, students had the opportunity to justify their answer. Graph 5, demonstrates very assertive and good opinions. In the word cloud, the words used more frequently can be appreciated in big letters; words such as good, suggestions, mistakes, explanations, etc. These are words used to justify their answer to question 3 of the first questionnaire, which can be seen the capability of ProWritingAid even with only one use.

Graph 6

ProWritingAid Features



Source: Developed by Adriana Gutiérrez Campos (2024)

According to the graph above, it can be shown the results gotten regarding the features of ProWritingAid. The software has 5 features that students can take advantage of for free when using the app.

The grammar feature is very useful according to 100% of the students. This feature shows the grammatical mistakes and explanation behind it. Also, as language learners, students tend to make more mistakes in this area compared to others. This feature is one of the most useful tools ProWritingAid has. Similarly, 100% of the students believe the spelling feature is as useful as the grammar tool because it seeks for the mistakes and corrects them. This feature is very effective when students misspell a certain word or do not know how to write it.

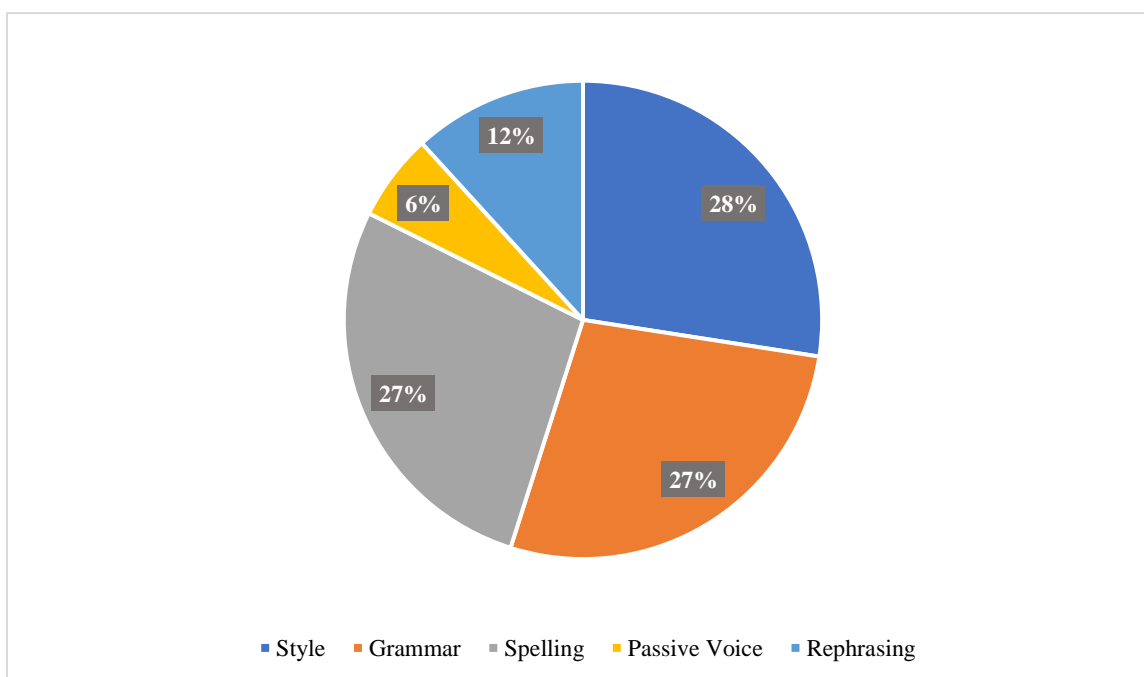
On the other hand, the style feature provides very good recommendations to students since 24 out of 28 students agreed with this feature and the minority mentioned the opposite. The objective of this feature is to make writing more enjoyable for the reader and try to avoid repeated sentence starts, words and phrasing.

Passive voice is sometimes used in writing, but incorrectly. For this reason, ProWritingAid has this tool enable for users. According to the graph above, most of the students think this feature is not very useful. This can be due to students not using a lot of passive voice, since they are asked to write in a certain verb tense. For terms of this investigation, Passive voice was not the tense of focused.

Lastly, the rephrasing tool is useful according to 22 students. When writing, sometimes rephrasing can be necessary to increase the writing capacity and understanding. As writers, students not always are aware of how a sentence can be changed to make it more suitable for their writing.

Graph 7

ProWritingAid Most Beneficial Features

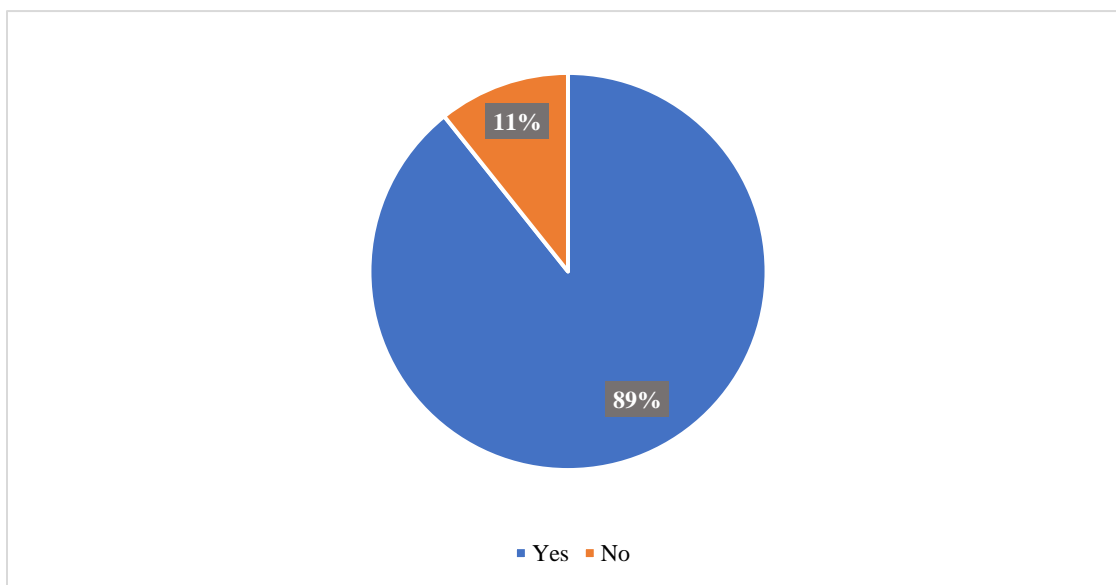


Source: Developed by Adriana Gutiérrez Campos (2024)

Graph 7 shows information regarding question #10 asked in the questionnaire. From all the features that ProWritingAid has, it was asked to students which was the one that benefited them the best. In this question, students had the possibility of choosing various options according to their preference. As shown above, 100% of students agree that grammar, spelling and style are equally important and surely benefit their writing the most. Then, only 12 (28%) students benefit from the rephrasing tool probably because it is just a matter of format. As language learners, the most important aspect is the subject-verb-agreement and the words well written. Thus, only 6% of students think that passive voice can benefit their writing. It is just a matter of likes and preferences; however, with ProWritingAid, students can get greater benefits.

Graph 8

Enhancement of Writing Skills



Source: Developed by Adriana Gutiérrez Campos (2024)

Graph 9

Explanation of Enhancement of Writing Skills



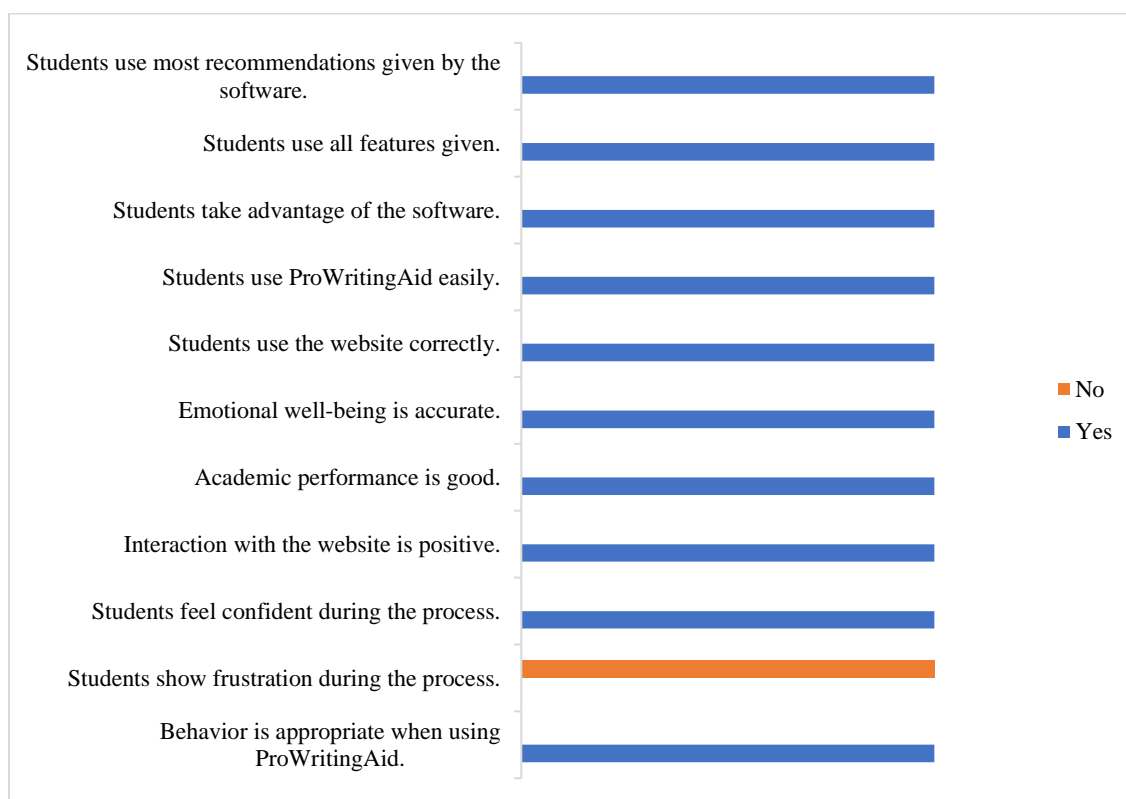
Source: Developed by Adriana Gutiérrez Campos (2024)

According to the graphs above, it is shown the results gotten of how students think ProWritingAid can enhance their writing skills. 89% (25) of students believe that by using the AI software, they can enhance their writing skills. It is necessary to highlight that with this first approach students believe this of ProWritingAid. By using it, it can work as a tool to help students develop more accurate writing abilities. Also, in graph 9 it can be appreciated the explanations of the enhancement of the writing skills. According to students, ProWritingAid can provide feedback, it is better to use it and it is and extra help students need when writing.

4.1.3 Observation

Graph 10

Implementation of ProWritingAid in 11-2



Source: Developed by Adriana Gutiérrez Campos (2024)

According to the graph above, it can be seen the aspects observed while the students used the ProWritingAid AI software. Students were required to write a paragraph in simple present about a free topic. The idea was that they could explore the software using something written on their own. In this observation, aspects such as how students use it, behavior and ease were part of it.

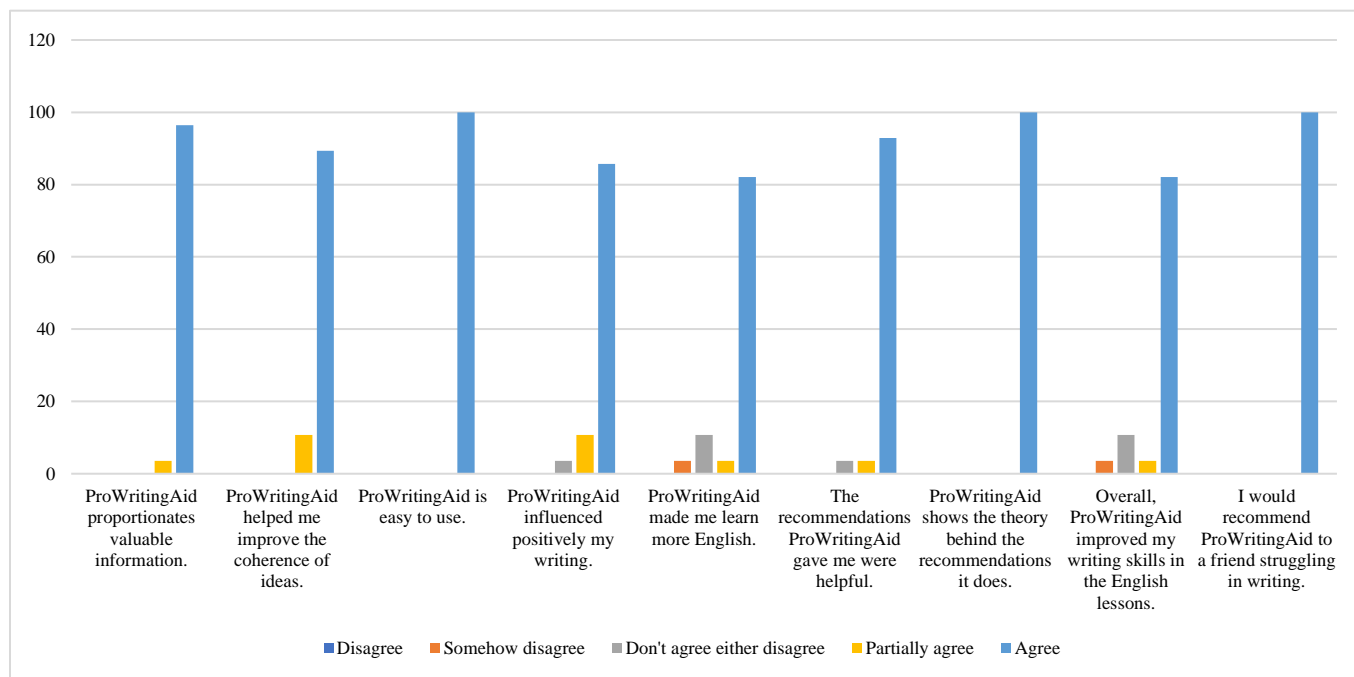
During the observation, many positive results were gathered concerning the use students gave to the software. As part of the performance, the eleventh graders showed good behavior and they did not seem frustrated at all. In fact, they looked confident when they used AI. Since they had a high confidence level, their interaction was positive. The researcher believes this first interaction was a success since they seem to like the software. In education, when using a certain tool, method or strategy, the well-being of students is a must to consider, and this aspect was one highly observed in students. They used the software in a very smooth way, which means it can have optimistic results for them.

Their academic performance with the software was better, since students having difficulties in writing could overcome this situation or at least decrease it. The software was first explored by the researcher, and it is a very friendly way to use AI. Students use it very easily and in the correct way. Actually, it can be assured that they really took advantage of it because they used all the features it has. They read and applied all the recommendations it gave them, which meant they applied the software in a very organized and helpful way.

4.1.4 Likert Scale

Graph 11

Opinion on ProWritingAid



Source: Developed by Adriana Gutiérrez Campos (2024)

According to the graph above, it can be shown the results gotten in the Likert Scale. In this scale, students had the possibility of choosing between five options according to their level of agreement on the statements. The objective was to gather the opinion of the participants on how ProWritingAid AI is perceived.

The first statement shows information concerning if ProWritingAid gave valuable information and 96.4% mentioned that they agree with this statement. This software provides very complete information needed to improve the writing skills.

The second statement that mentioned if ProWritingAid helped improve the coherence of ideas, 89.3% of students agreed with this statement. Coherence of ideas is extremely important when writing, for this reason, most students agree with this statement and a minority partially agree.

ProWritingAid is a very friendly software to use, so students agree that it was easy to use it. In fact, 100% of students thought it was super easy to use. Also, the recommendations it provides users with are accurate and helpful. It shows good suggestions concerning the topic of writing. The eleventh-grade students agree 100% with this statement. Besides, since they agree with the previous statements, they agreed to suggest this software to a friend.

Definitely, students approved that ProWritingAid positively influenced their writing. It gave them suggestions they did not think about. Besides, in writing there is always room for improvement.

The fifth statement mentioned that ProWritingAid made students learn English. Of course, this AI tool is not a learning English program; however, it makes users be aware of their own mistakes. In this way 82.1% agree, 3.6% partially agree, 10.7% don't agree either disagree and 3.6% somehow disagree. There are different opinions on this statement, but most of the responses are positive since the software explains the feedback it gives, it not only corrects mistakes, it goes beyond.

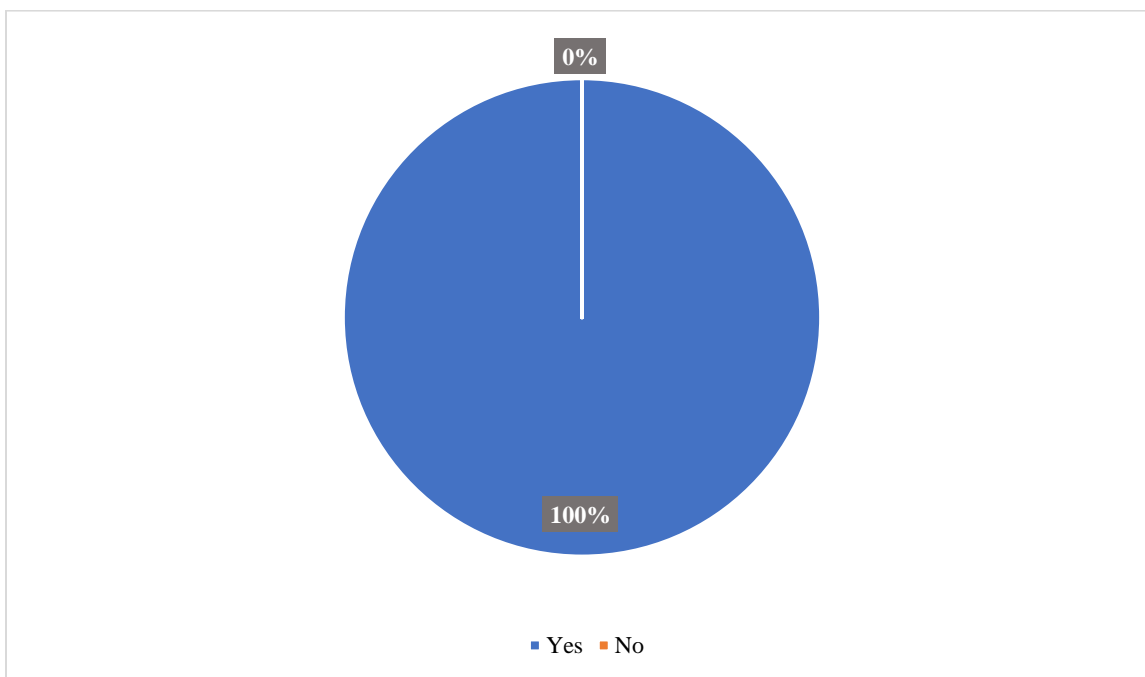
ProWritingAid according to students, improves their writing skills during the English lessons. 82.1% agree, 3.6% partially agree, 10.7% don't agree either disagree and 3.6% somehow disagree. It is true the software shows very good recommendations and feedback and

that is why most of the students show positive responses to this statement. The minority might feel the software does not necessarily improve the writing skills and it works as a helper.

4.1.5 Posttest (Questionnaire II)

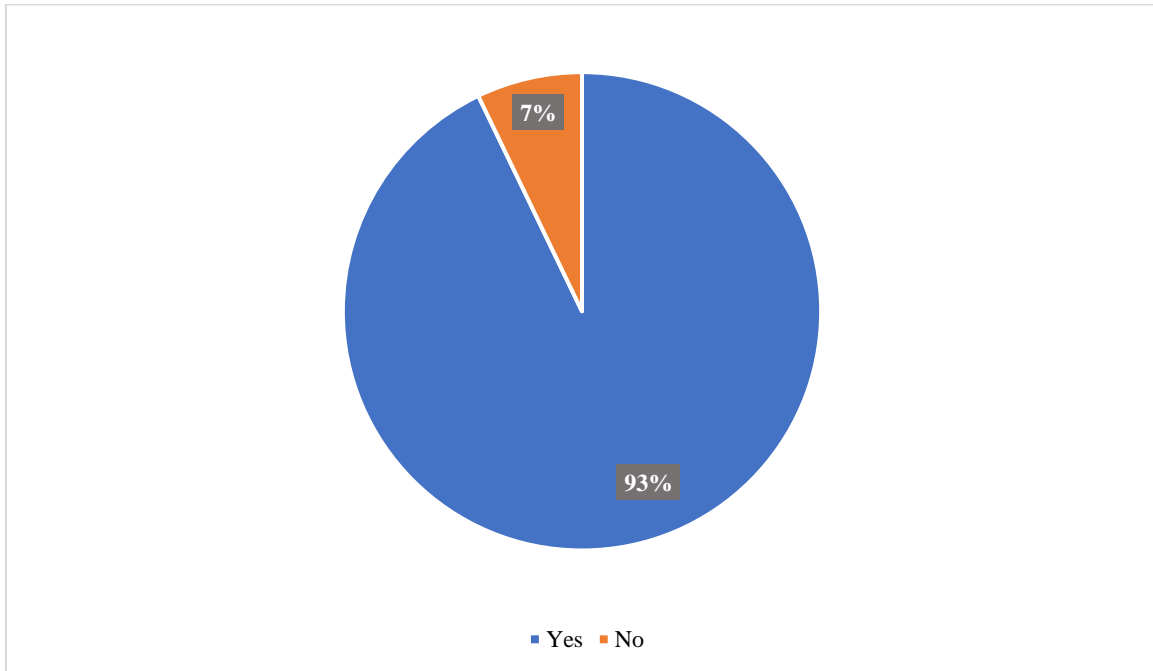
Graph 12

Usefulness of ProWritingAid



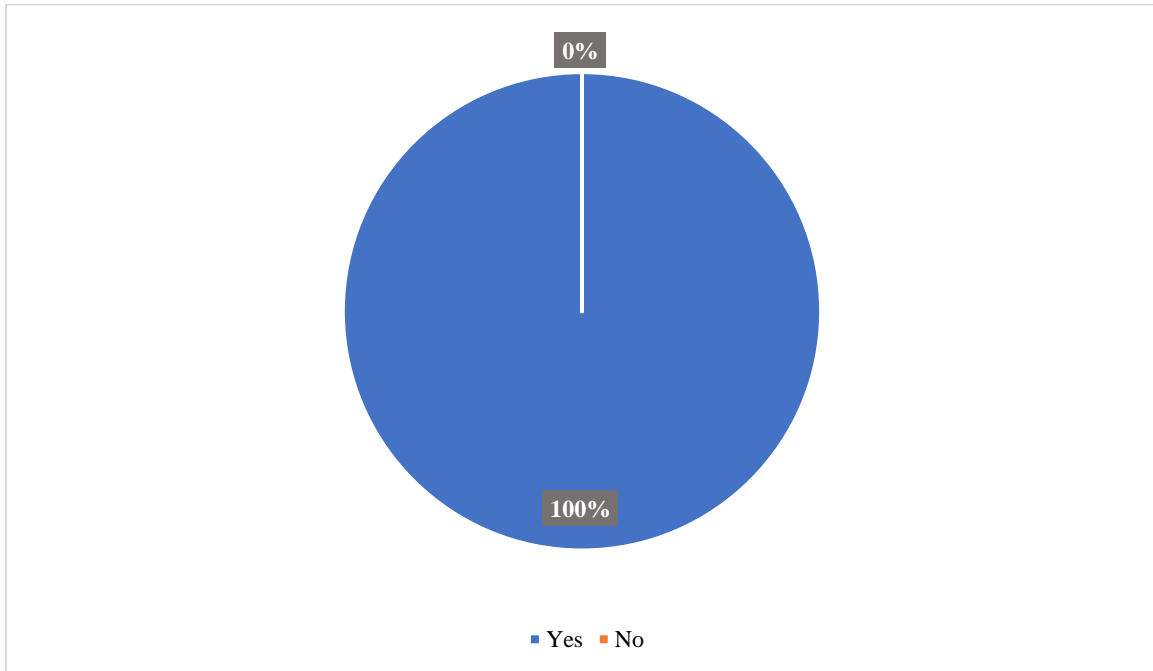
Source: Developed by Adriana Gutiérrez Campos (2024)

According to graph 12, it can be shown the results gotten to conclude the investigation process. Students were asked if they considered ProWritingAid to be a useful tool and 100% of students marked “yes”. With this answer, it can be seen how ProWritingAid is a helpful and valuable tool students and teachers can use in the educational environment. As technology has been evolving, it is important to implement new strategies and let students use diverse tactics.

Graph 13*Future Implementation of ProWritingAid*

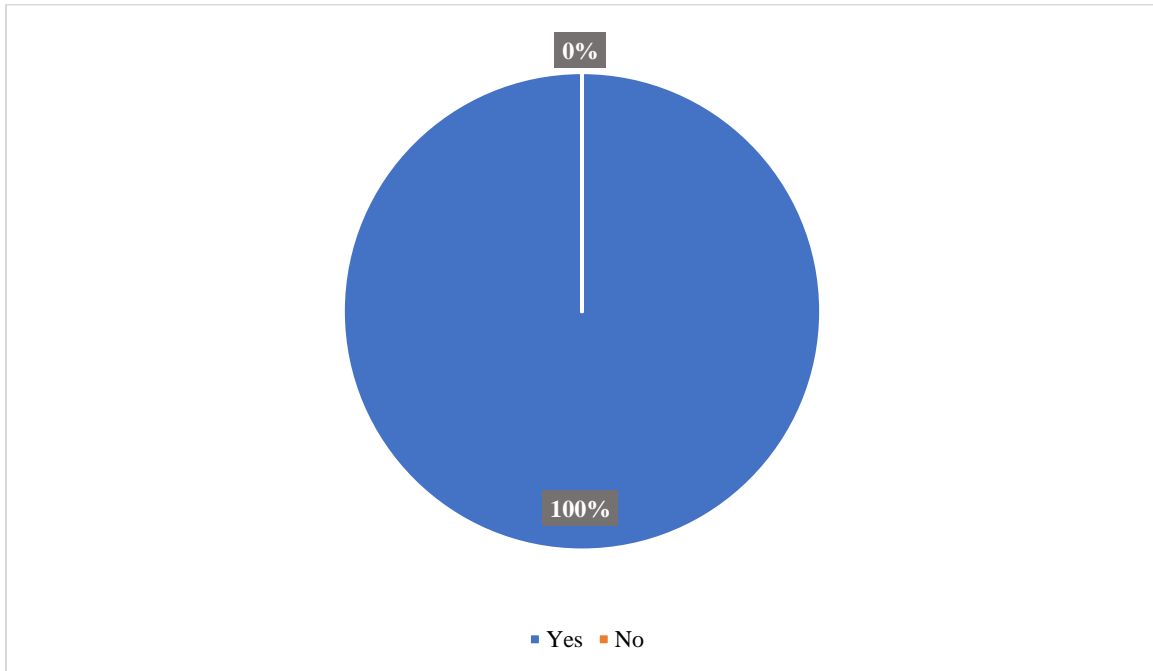
Source: Developed by Adriana Gutiérrez Campos (2024)

As shown above, 26 students out of 28 stated that they will continue implementing ProWritingAid when they are required to write. This shows how effective and beneficial it can be for students in the learning process. ProWritingAid is a tool to help students with their writing abilities and the easy use can reassure it.

Graph 14*Features to Improve Writing*

Source: Developed by Adriana Gutiérrez Campos (2024)

In graph 14 it can be appreciated the results gotten when students were asked about the features of ProWritingAid. 100% of students voted “yes” since the features the software has are the ones needed to succeed in writing. In this case, features such as grammar, spelling, style, rephrasing and passive voice are needed to write. Some of them may be more used than others, but it depends on the type of writing the person does.

Graph 15*Writing Goals and Preferences*

Source: Developed by Adriana Gutiérrez Campos (2024)

As shown above, it can be concluded that 100% of students believe that the suggestions of ProWritingAid align with their writing goals and preferences. It is very important to find the perfect fit for your writing and ProWritingAid has shown it is the perfect tool to show these aspects. When writing, it is important to get a second opinion and feedback, which definitely ProWritingAid can provide users.

Graph 16

Overall Experience

Positivity	Feedback	Future
ProWritingAid has enhanced my writing ability.	It is good to write by my own and make sure if the words and grammar are correct.	I have never used a writing AI tool, and I am excited because this one is helpful for students struggling.
ProWritingAid has made me more conscious of my errors.	I am satisfied with what ProWritingAid gives people.	The app can help me from now on in school to do better.
I can write with more clarity and express better.	Sometimes when you write you do not see the mistakes in your writing and this tool can make you see those mistakes.	I will continue to use this app sometimes to write beautifully.
The process of writing makes it more likeable.	ProWritingAid shows a good feedback of what you have wrong or how to improve aspects.	It was good. I can develop better projects from now on.
It is very easy to use, and it does not require a lot of experience on using it.	I liked the app a lot because it gave a lot of feedback on writing. It works as a private teacher.	ProWritingAid is a good tool for people to have a better time writing. I will definitely start using this more often.

Source: Developed by Adriana Gutiérrez Campos (2024)

The graph above summarizes the responses gathered when the 28 students were asked to provide their overall experience using the AI software. Along the research, most answers were positive and accurate. In fact, the tool provides very complete feedback, and its easiness is well received. When using technology, the person seeks for new, innovative and easy use. According to the previous answers, ProWritingAid has everything to adjust to students' needs. Students decided that they wanted to continue implementing this software in the future, which says a lot about their AI experience.

CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this chapter, the conclusions of the general research are shown and presented based on the theory, examination of student performance and previous result analysis. The main purpose of this section is to conclude how AI can impact on eleventh graders writing skills. The conclusion is drawn to the impact and importance of integrating technological tools and different strategies when writing.

Through these conclusions, it is important to answer the question of investigation to find out if the general purpose of the research was reached. The question was: **What is the effectiveness of using ProWritingAid AI software with scaffolding strategies to develop coherence of ideas in writing on eleventh grade students from New Hope Bilingual School during the I quarter 2024?**

As a matter of fact, based on the theory checked and consulted for this investigation, ProWritingAid is a tool that works for writing and can increase student independence in the writing process. A tool like this one can develop better understanding and usage of ideas in the writing process. It works as a helper in the process of writing, which can benefit learners. It assists users with grammar, style and structure analysis. When it is integrated with scaffolding strategies, it provides step-by-step guidance and support. As a result, it can significantly enhance students' writing skills by offering immediate, detailed feedback and personalized suggestions.

ProWritingAid's algorithms can focus on struggles students might have, such as grammar or transition between ideas. In fact, students can develop a more logical and fluid progression of thought in their essays and other written assignments. One of the major visions was to implement ProWritingAid along with teacher support. This dual approach helps students build confidence

and gradually take ownership of their writing process, leading to more coherent and well-organized essays.

Also, by using technological tools and what is trending, students are likely to feel engaged and more likely to become better writers. The integration of ProWritingAid AI software with scaffolding strategies holds significant potential for enhancing the coherence of ideas in the writing of eleventh-grade students at New Hope Bilingual School because it provides a detailed, real-time feedback. As students become more proficient, they will contribute to a better academic performance.

It can be assured that the software has many features that can help English learners. The effectiveness of the AI software is definitely high because it shows very complete and good feedback to students' writing skills. Also, the software increases thinking skills because it makes them realize if it really is providing an accurate suggestion. At the end, students write their own material, and they decide if they consider the feedback ProWritingAid gives can work for their writing.

Moreover, according to the specific objectives, each objective is answered by the application and conclusion of the acquired results in chapter IV.

- a) According to the first specific objective, which was “Establish the appropriate use of ProWritingAid AI software when developing writing tasks.”, it was developed in the first instrument (Questionnaire I) used in the research. This first approach showed positive results, even though students do not use AI much. Actually, they did not know about this app. This objective was achieved since the goal was to build an approach with the software and teach students how to use it. With this app, students got to experiment and find the usefulness of the app with previous written material. It can be concluded that,

with the execution of this first approach, students found the software interesting willing to apply it in their own written pieces.

- b) The second objective said, “Identify the proper use of ProWritingAid as an AI software that enhances writing skills and coherence during the Literature & Language lessons.” In this objective, students felt comfortable and safe when using the app. This was proven due to an observation of the students. They wrote a paragraph of their own, and they could develop successfully with ProWritingAid. To know the achievement of the objective, the researcher observed students while using the software. In this case, it was achieved; however, students’ English level was so elevated that their mistakes were minority. This could have had an impact in the results and the investigation in general because students already have an advanced level that can make them write with elevated content.
- c) The third objective “Determine the correct procedure of writing skills and coherence of ideas handling AI software during the English lessons.” was achieved, via a Likert Scale to gather the opinion of the students. Also, this was a success since the students’ level of agreement was notorious. Students used the software very smoothly and they took advantage of the feedback provided. The implementation of this app has been proved to be an effective tool in writing skills. With this tool, students can construct well-organized and clear written pieces. Overall, integrating ProWritingAid into the class has facilitated a more interactive and supportive learning environment, contributing to the development of confident writers.
- d) According to the fourth specific objective “Examine the effectiveness of ProWritingAid AI software as a tool to enhance mechanics when writing.”, the software was analyzed

carefully to gather accurate results. To conclude, the students' overall opinion of the software was very positive, although students' level was high. The software's comprehensive feedback on grammar, punctuation, and style allowed students to identify mistakes and correct them. With the software students have demonstrated that with ProWritingAid their writing can increase and write with minor errors.

As a result, ProWritingAid has been shown to be a positive AI software that provides many benefits to students and people in the learning process. The integration of ProWritingAid contributes to innovative techniques in the class and is a tool for students to use on their own without a tutor's supervision. With this tool, students are in the capacity of producing coherent and well-organized written works. It definitely empowers students to work independently and refine their writing through feedback.

In conclusion, ProWritingAid can be described as a tutor, easy to use and good in helping students in their writing process. It has features that align with the writers' priorities and writing style. So, it can be a good and recommended tool to apply when students have achieved certain level in the English language, specifically in the writing skill.

5.2 Recommendations

Based on the results' analysis of this study, some recommendations have been added for future investigations. The goal is to correct differences and provide solutions to certain actions presented in the current research.

- a) It is recommended to implement the investigation with students at a lower level that need to improve their writing skills. For example, seventh grade or eight grade since students can have a more evident progress with the tool throughout the next years of high school.

- b) Ensure that schools are equipped with the necessary technological resources to support the use of ProWritingAid. This includes a device, reliable internet connectivity, and up-to-date software licenses to be able to carry out the research.
- c) For future researchers it is recommended to analyze and manage the software before applying an investigation. This can be a limitation and can affect the investigation process. ProWritingAid is easy to use; however, it has diverse features. Besides, the free version has features for everyone, but the premium version can work better for the investigation.
- d) Since the investigation was applied only to students, it can be remarkable to explore the opinion of teachers on this topic. It can be analyzed how they implement the software in the classroom and their judgment. In contrast, this investigation might take more time because teachers have to be trained on the correct use of the AI software.
- e) For students it is necessary to incorporate activities that make the use of ProWritingAid engaging and relevant in the learning process. This could include writing assignments on topics of interest, gamification, and opportunities for creative expression.
- f) Foster a culture of continuous improvement where educators regularly share insights, challenges, and successes related to the integration of AI software and writing instruction. This in order to create a more innovative institution on the topic of technology.

CHAPTER VI: PROPOSAL

6.1 Name of the Proposal

For the proposal of the present investigation, the name assigned is “Innovating Education Through AI in the English Class”. This project tries to encompass the implications during the research: “The Effectiveness of Using ProWritingAid AI software with Scaffolding Strategies to Develop Coherence of Ideas in Writing on Eleventh Grade Students from New Hope Bilingual School During the I Quarter 2024”.

6.2 Description

This proposal consists of developing a project with the eleventh-grade students using Artificial Intelligence along with their usual classes, in order to have a balance. The length of this project is 8 lessons of the Literature & Language Skills class. The vision of this project is to utilize diverse activities along with the ProWritingAid AI software.

The project will consist of a comparison on the way students write by themselves, compared to using ProWritingAid AI software in their writing. In this project, students will write applying all the steps of the writing process. They will deliver their final work to be analyzed. Besides, students will use the AI software ProWritingAid to write a second paragraph. They will deliver their final work to be analyzed. So, the idea is to contrast writing with AI and writing without it.

6.3 Place to be developed

The proposal is designed to be applied in Santa Bárbara de Heredia at New Hope Bilingual School. The population for this project is the eleventh graders since they are the students with the highest English level. This institution is very technological, so it is recommended for this study. The project considers the appliance of Artificial Intelligence to enhance writing skills in students.

6.4 Organization

New Hope Bilingual School is one of the best private institutions in Heredia, Costa Rica. The institution compromises to apply the proposal project asking for the appropriate permissions beforehand and in the correct manner.

6.5 Involved Population

The goal population for this project is the eleventh-grade students. There are 4 groups of eleventh grade; however, with one group is more than enough to develop the proposal. Each group has approximately 25 students. This project will begin in the last trimester of 2024. When applying this project, the students are going to be familiar with the appliance of the AI software since they used it at the beginning of the same year.

6.6 Objectives of the Proposal

6.6.1 General Objective

Demonstrate the use of ProWritingAid AI software in writing skills with eleventh grade students.

6.6.2 Specific Objectives

- a) Apply the ProWritingAid AI software when developing writing activities.
- b) Analyze the use of ProWritingAid AI software along with the writing skills.
- c) Examine the effectiveness in writing by using the ProWritingAid software.

6.7 Chronogram of Activities

Lesson	Activity/Schedule
1 & 2	Write a paragraph in past tense following the steps of the writing process.
3 & 4	Write a paragraph using ProWritingAid AI software.
5 & 6	Write a paragraph in future tense following the steps of the writing process.
7 & 8	Write a paragraph using ProWritingAid AI software.

Source: Developed by Adriana Gutiérrez Campos (2024)

6.8 Budget for its implementation

For the implementation of this project, there is no budget. It does not take into consideration money. The only specifications are disposition and following the previous project. Also, this project needs to be applied to have results regarding the use of AI.

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Annexes

Annex 1

Pretest – Questionnaire I

The purpose of this questionnaire is to know aspects concerning the use of ProWritingAid AI software. The information will be used for educational purposes. It is required to be filled out to know what students have learned after the workshop related to ProWritingAid. The answers will be anonymous and confidential. Your collaboration is well received.

1. Do you usually use AI on a regular basis?
 - a. Yes
 - b. No
2. Did you know about ProWritingAid before the workshop?
 - a. Yes
 - b. No
3. From this first approach, did you think the suggestions overall were assertive and beneficial?
 - a. Yes
 - b. No
4. Justify your answer to question 3.

5. Do you find the grammar checking feature of ProWritingAid useful?
 - a. Yes
 - b. No
6. Do you find the spelling feature of ProWritingAid useful?
 - a. Yes
 - b. No
7. Do you find the style feature of ProWritingAid useful?
 - a. Yes
 - b. No

8. Do you find the Passive Voice feature of ProWritingAid useful?
- a. Yes
 - b. No
9. Do you find the rephrasing feature of ProWritingAid useful?
- a. Yes
 - b. No
10. Which of the following features of ProWritingAid do you think is the one the benefits you are writing the most?
- Style
 - Grammar
 - Passive Voice
 - Rephrasing
11. Do you think, after this first approach, ProWritingAid can enhance your writing skills?
- a. Yes
 - b. No
12. Justify your answer to question 11.

Annex 2

Observation – Checklist

The purpose of this observation is to analyze how students behave, use, and perceive the ProWritingAid AI software. The information will be used for educational purposes. The researcher will be the only person to have access to the results. Aspects will be anonymous and confidential.

Item	Yes	No	Comments
1. Behavior is appropriate when using ProWritingAid.			
2. Students show frustration during the process.			
3. Students feel confident during the process.			
4. Interaction with the website is positive.			
5. Academic performance is good.			
6. Emotional well-being is accurate.			
7. Students use the website correctly.			
8. Students use ProWritingAid easily.			
9. Students take advantage of the software.			
10. Students use all features given.			
11. Students use most recommendations given by the software.			

Annex 3

Likert Scale

The purpose of this Likert Scale is to determine the procedure of writing skills and coherence of ideas concerning the use of ProWritingAid AI software. The information will be used for educational purposes. It is required to be filled out to gather the opinion of the participants on how ProWritingAid AI is perceived. The answers will be anonymous and confidential. Your collaboration is well received.

Item	Disagree	Somehow disagree	Don't agree either disagree	Partially agree	Agree
1. ProWritingAid proportionates valuable information.					
2. ProWritingAid helped me improve the coherence of ideas.					
3. ProWritingAid is easy to use.					
4. ProWritingAid influenced positively my writing.					
5. ProWritingAid made me learn more English.					
6. The recommendations ProWritingAid gave me were helpful.					
7. ProWritingAid shows the theory behind the recommendations it does.					

8. Overall, ProWritingAid improved my writing skills in the English lessons.					
9. I would recommend ProWritingAid to a friend struggling in writing.					

Annex 4

Posttest – Questionnaire II

The purpose of this questionnaire is to know aspects concerning the use of ProWritingAid AI software. The information will be used for educational purposes. It is required to be filled out to know if ProWritingAid AI is an effective tool to enhance mechanics when writing. The answers will be anonymous and confidential. Your collaboration is well received.

1. Do you consider ProWritingAid a useful tool?
 - a. Yes
 - b. No
2. Would you continue implementing ProWritingAid in your writing?
 - a. Yes
 - b. No
3. Do you consider the features that ProWritingAid has are the ones needed to improve writing?
 - a. Yes
 - b. No
4. Do the suggestions of ProWritingAid align with your writing goals and preferences?
 - a. Yes
 - b. No
5. Provide your overall experience using ProWritingAid.
