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Artificial Intelligence in English Language Learning: Insights from University of Vakinankaratra Engineering, ENS Students, and English Teachers in Antananarivo, Madagascar

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Abstract:

Artificial Intelligence (AI) has become an integral part of 21st-century life and is playing a crucial role in foreign language learning, especially in improving students' English proficiency. This article highlights AI's transformative role in delivering personalized learning experiences, intelligent tutoring, gamified environments, language learning applications, and automated assessments. These tools adapt to individual needs, provide instant feedback, engage learners interactively, and enhance language skill evaluations, leading to greater student engagement and autonomous learning. While AI offers many advantages, potential challenges and issues in its implementation must be considered. How can Artificial Intelligence be utilized to transform English language learning/teaching by offering diverse learning opportunities and improving the educational experience for both students and teachers? In Madagascar, the importance of English learning and teaching is increasing as various centers and institutions strive to promote the language. A survey conducted in July 2024 with 50 engineering students from the University of Vakinankaratra and 10 students from the Ecole Normale Supérieure (ENS) in Antananarivo shows high receptiveness to AI in language learning, with 90% of participants demonstrating a strong understanding of its role. Additionally, surveys from 12 English teachers in Antananarivo revealed that 75% of them recognize the benefits of AI for both teaching and learning. These findings underscore AI's expanding role in English education, its positive influence on language acquisition, and its potential for enhancing teaching methods.

Keywords:

Artificial intelligence; English Learning; Personalization; Educational innovation; Madagascar.

I. Introduction

In recent years, Artificial Intelligence (AI) has significantly impacted various sectors, including education, with notable advancements in English language learning. As the demand for English proficiency grows in global communication, AI-powered tools and platforms are providing innovative methods to improve language acquisition. From personalized learning paths to real-time feedback and adaptive assessments, AI is transforming the way learners of all ages and backgrounds engage with the English language.

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Various learning platforms and software applications, such as Duolingo, Babbel, and Rosetta Stone, now use AI to create customized learning experiences by adjusting to individual students' proficiency levels and preferences, intelligent tutoring systems, gamified environments, and automated assessments.

As Lesia Viktorivna et al. point out, AI enables students to access a variety of courses and curricula worldwide, emphasizing the potential of AI to create a more inclusive and accessible education system globally (2022). During the COVID-19 pandemic, when face-to-face learning was restricted, educators leveraged online platforms such as YouTube, Telegram, WhatsApp, and Google Classroom, using videos to improve students' reading skills (Ulfa, 2023).

Madagascar is actively working to promote English as an international language crucial for communication and socio-economic development. Despite facing limited resources, students display a strong ability to create learning opportunities outside the classroom, driven by intrinsic motivation (Ambinintsoa et al., 2022). In rural areas, challenges are heightened due to a lack of linguistic immersion and restricted access to technology (Andrianjary et al., 2023). These findings underscore the need to tailor English language education to local contexts, learner interests, and innovative teaching strategies, especially in resource-constrained environments (Ambinintsoa et al., 2022).

Recent studies have investigated the integration of AI in English Language Teaching and Learning (ELT/L), revealing both advantages and challenges. AI-powered tools, such as Google Assistant, have demonstrated potential in supporting English as Foreign Language (EFL) learners, with students generally expressing positive attitudes toward their use. These tools can enhance various language skills, including speaking, writing, reading, and self-regulation (Crompton et al., 2024). However, challenges remain, including technological failures, limited AI capabilities, and concerns about language standardization (Crompton et al., 2024).

For Malagasy students, English remains particularly difficult to acquire, as the linguistic environment does not offer as many opportunities for daily exposure as French does. Although new technologies are gradually becoming part of everyday life, especially among youth, the availability and affordability of materials, tools, and internet access remain significant hurdles across Madagascar. In addition, poor internet network quality, frequent electricity blackouts by Jirama , and the high cost of internet connections further hinder the potential benefits of AI and technology for language learning.

The following question emerges from this issue: "How can Artificial Intelligence be utilized to transform English language learning/teaching by offering diverse learning opportunities and improving the educational experience for both students and teachers?" The hypothesis suggests: "Integrating Artificial Intelligence can significantly improve students' proficiency in the English language."

This study delves deeper into the role of AI in English language learning, specifically among engineering students at the University of Vakinankaratra, ENS students, and English teachers in Antananarivo, Madagascar. By examining how these groups interact with AI-based tools, the research sheds light on the effectiveness of AI in improving English proficiency. It highlights both the benefits and challenges of implementing AI in the English learning and

teaching in Madagascar, offering insights into how technology can enhance language learning in diverse contexts.

II. Review of Literature

AI refers to the development of computer systems capable of carrying out tasks that typically require human intelligence, such as pattern recognition, natural language comprehension, decision-making, and problem-solving. AI technology aims to create machines with human-like intelligence that can learn from experience and process, analyze, and apply data to continuously improve their performance (Stewart et al., 2020). Currently, AI is utilized in various fields, including speech recognition, image analysis, autonomous vehicles, and language translation. The primary goal of AI research is to develop systems that can perform tasks with a level of precision and efficiency similar to humans (Bartneck et al., 2021).

AI is increasingly being integrated into ELT to improve engagement, efficiency, and accessibility in language learning. Popular AI-driven applications like ChatGPT, Coursera, Duolingo, Elsa, and Grammarly have gained traction among learners, while also aiding teachers in their instruction. Many AI-based platforms use Natural Language Processing (NLP) to create virtual tutors that engage learners in interactive conversations, assessing speaking and writing skills and offering tailored feedback. Additionally, AI applications with speech recognition offer real-time pronunciation feedback, helping students enhance their speaking abilities.

AI has revolutionized autonomous English learning by providing personalized, adaptive experiences that enhance speaking and listening practice while improving accessibility (Han, 2019). These platforms allow learners to take control of their learning process, offering immediate feedback on pronunciation, grammar, and vocabulary. Additionally, they analyze performance, recommend lessons, and provide interactive activities to boost engagement. The overarching goal of AI in ELT is to make learning more efficient, engaging, and accessible for learners globally.

AI-enhanced language learning offers promising opportunities for improving education in Madagascar, a country where access to quality educational resources and skilled language teachers is often limited, particularly in rural areas. The introduction of AI tools could play a transformative role in making language learning and teaching more accessible, personalized, and effective, supporting the development of linguistic skills in Malagasy, French, and English.

2.1 Benefits and challenges in the use of AI in ELT

a. AI-Enhanced Language Learning Platforms

Popular applications like Duolingo, Babbel, and Busuu have demonstrated effectiveness in accelerating language acquisition through gamification and personalized learning (Смуглякова & Пономаренко, 2023). AI tools offer benefits such as reduced learning time, cultural exposure, and adaptive learning algorithms (Vall & Araya, 2023). In Africa and beyond, AI offers numerous benefits for English language learning. They provide personalized learning experiences, adapting to individual needs and proficiency levels (Agrawal, 2024); (Rusmiyanto et al., 2023). These technologies enhance student engagement, offer real-time feedback, and support various language skills including speaking, listening, reading, and writing (Rusmiyanto et al., 2023); (Agrawal, 2024). For teachers, AI facilitates progress monitoring, automates administrative tasks, and provides advanced analytics

(Agrawal, 2024).

However, they also present challenges, such as implementation difficulties, ethical concerns, and potential threats to traditional teaching methods (Campoverde-Quezada & Valdiviezo-Ramírez, 2024); (Umar, 2024). Despite these challenges, AI has the potential to significantly improve English language education by offering 24/7 support, enhancing learner-instructor interactions, and creating more flexible and accessible learning environments (Agrawal, 2024); (Rukiati et al., 2023). Careful consideration of both benefits and limitations is crucial for effective AI integration.

b. AI Platforms for English Learning

AI-driven tools, such as chatbots, applications, and virtual reality technologies, support self-directed learning by expanding exposure to English and providing interactive practice opportunities (Anh, 2024); (Dewi et al., 2021).

AI chatbots are platforms powered by machine learning that assist students in setting goals and improving their English learning through data-driven insights. Machine learning uses mathematical data models to allow computers to learn autonomously, improving their performance as they process more data over time. This process mirrors how students independently improve their English skills, with progress occurring gradually as they engage with the language beyond the classroom. The innovative approach to English learning, grounded in machine learning, explores the potential of a student-centered method incorporating AI chatbots (Anh, 2024).

The integration of AI enables more effective teaching processes by assisting teachers in class design and facilitating various pedagogical approaches. Machine learning algorithms, which improve over time with increased data input, mirror the natural language acquisition process, potentially leading to better learning outcomes (Anh, 2024). While these studies demonstrate the promising role of AI, further research is needed to fully assess its impact on students' English proficiency and to explore its long-term effectiveness in diverse educational contexts (Betaubun et al., 2023); (Dewi et al., 2021).

Winaitham (2022) highlighted AI functions utilizing NLP, Machine Learning, and Deep Learning, including data warehouse systems, digital communication platforms, and AI-based teaching systems. They can enhance English learning/teaching through digital platforms and interactive AI-based teaching systems (Grammarly, Duolingo and Google Translate). AI has improved English learning through digital tools and advanced dialogue systems, enhancing communication and language retention. Hang et al. (2024) emphasized its role in revolutionizing second language learning through intelligent chatbots, voice assistants, and technologies like computer-assisted language learning (CALL) and mobile-assisted language learning (MALL).

c. Challenges of AI in English Learning

Although the use of AI provides many advantages, there are concerns about potential technology failures, limited functionalities, and the standardization of language (Crompton et al., 2024). Students fear losing personal information, natural interactions with speakers, and their creativity (Lesia Viktorivna et al., 2022). Additionally, issues with accuracy, dependency on extensive datasets, and institutional resistance may hinder AI adoption in educational settings (Evenddy, 2024). Despite these challenges, AI has the potential to transform English language education by addressing diverse learner needs and improving communication skills

(Rusmiyanto et al., 2023).

One potential threat is the risk of diminishing the role of human teachers. As the tools become more advanced, tasks traditionally carried out by teachers, such as grading and providing feedback, could be replaced by AI systems (Godwin-Jones, 2022); (Huang et al., 2023). While AI can complement teachers' efforts, it is crucial to avoid fully substituting human interaction in the learning process. Concerns surrounding the platforms include potential bias due to reliance on training data that may perpetuate inequalities, the need for diverse and inclusive data to prevent biased outcomes, and significant privacy issues related to the collection and analysis of students' data. Additionally, the reliability and accuracy of these systems must be carefully evaluated, as there is a risk of providing inaccurate feedback on students' progress.

2.2 AI Systems for English Learning and Teaching in Images

Figure 1. *AI for English learning*

https://phoenixenglishlang.com/ai-and-english-learnin/

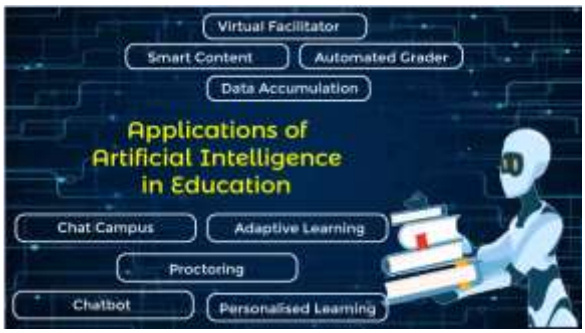

Figure 2. *Applications of AI in Education*

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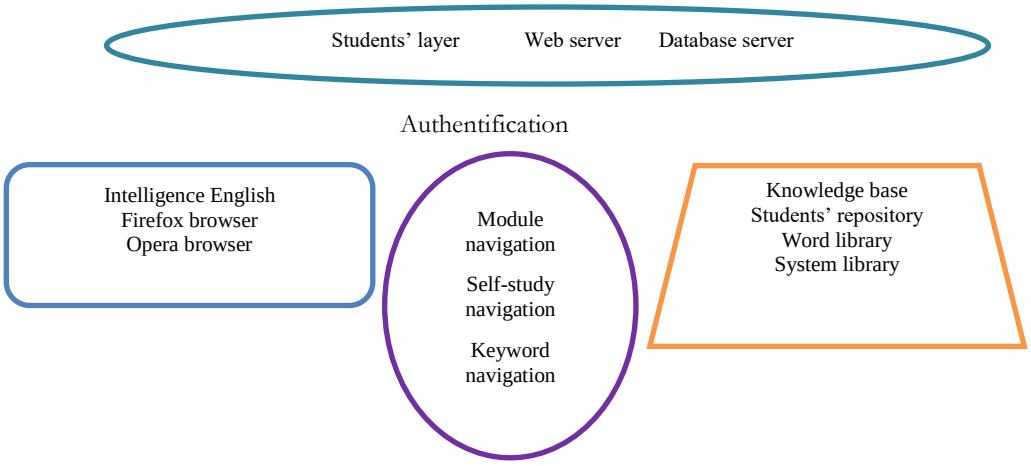


Figure 3. *Design of AI-based for English learning*

2.3 Leading AI tools for English learning and teaching

This section examines key AI tools that develop English learning and teaching.

a. AI in Enhancing Listening and Speaking Skills

AI tools enhance listening and speaking skills through real-time feedback, personalized learning, flexibility, and interactive experiences like gamification.

Table 1. AI Tools for Enhancing Listening and Speaking Skills

Speech Recognition Technology	*Elsa Speak- Google Assistant*
Natural Language Processing (NLP) for Conversational Practice	*Duolingo- Mondly*
AI-Powered Listening Practice Tools	*Lingoda- Speechify*
Interactive Virtual Tutors	*Speak2Me- ChatGPT*
Voice-Activated Language Learning	*Google Assistant- Amazon Alexa*
AI-Driven Language Games and Quizzes	*Rosetta Stone- Busuu*
Augmented Reality (AR) and Virtual Reality (VR) for Speaking and Listening	*Mondly VR- ImmerseMe*

They can offer features such as speech recognition, conversation practice, and accent reduction, serving as virtual tutors. Elsa Speak, Duolingo, and Rosetta Stone can help students refine their skills through authentic practice. However, AI should complement, not replace, real-life conversation with native speakers, as it cannot fully replicate human interaction. Combining AI with face-to-face communication is crucial for optimal language development.

b. AI in Enhancing Writing Skills

A range of AI-powered writing tools assists users in enhancing their writing, grammar, vocabulary, and style. The most widely used tools, such as Grammarly, ChatGPT, ProWritingAid, QuillBot, Hemingway Editor, Ginger Software, and WriteSonic, play significant roles in enhancing writing.

They can enhance English writing by providing instant feedback, grammar improvements, and content generation, catering to various writing needs. While they improve efficiency and writing quality, they have limitations in understanding context and nuance, which can result in errors. Relying solely on AI for essays is not advisable, as it cannot replace critical thinking and analytical skills. Students should continue developing these skills alongside using AI tools for optimal writing development. As Godwin-Jones (2022) suggested, the most effective approach to essay writing combines AI tools for grammar and spelling with the student's own critical thinking and writing abilities.

c. AI for Reading Skills

These tools can personalize learning, provide real-time feedback, and adjust to each learner's progress.

Table 2. AI for Enhancing Reading Skills

AI-Powered Reading Platforms	*Newsela- Raz-Kids*
AI-Driven Text Analysis and Summarization Tools	*QuillBot- Resoomer*
Adaptive Learning and Personalized Feedback	*Lingvist- Epic!*
AI for Vocabulary Enhancement	*Vocabulary.com- WordUp*
Speech-to-Text for Reading Assistance	*NaturalReader- Google Text-to-Speech*

AI-Driven Language Learning Apps	*Duolingo- Babbel*
AI grammar checkers	*Grammarly- ProWritingAid*

The benefits of using AI for reading English include the followings:

a. Personalization: AI tailors reading materials to the learner's level and progress, ensuring the content is challenging yet understandable.
b. Instant Feedback: Real-time corrections and feedback help learners quickly understand their mistakes and improve their reading comprehension.
c. Vocabulary Expansion: AI tools introduce new vocabulary in context, making it easier for learners to understand and remember new words.
d. Enhanced Engagement: Interactive and gamified elements keep learners motivated and make reading more enjoyable.
e. Improved Access: AI-powered digital libraries and eBooks provide learners with a wide range of reading materials anytime, anywhere.

AI revolutionizes English reading by offering personalized, interactive tools that enhance comprehension, vocabulary, and engagement, making language learning more efficient.

III. Research and Methods

The study areas are located in the University of Vakinankaratra Antsirabe where engineering students are affiliated, in Ecole Normale Supérieure (ENS) of University of Antananarivo for the teacher-students and in Antananarivo Region where the interviewed English teachers are working. The total number of interviewed students is 60: 20% come from the industrial engineering Textile Sciences and Engineering (SIT), 25% from the Electro-mechanical industrial engineering (EM), 38.3% from rural engineering and finally, 16.7% from ENS. They are in levels 1 and 2. 12 English teachers were interviewed: 75% from public lycées while 25% from private courses. 83.3% teach in upper secondary schools, 8.3% in university and 8.3% in lower secondary schools.

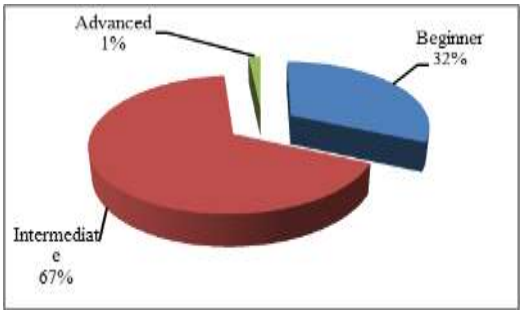
The survey was conducted in July 2024 in Antsirabe and Antananarivo in terms of receptiveness to AI in language learning and teaching. The data were collected through the use of statistical tools Excel 2014 as well as SPSS 25 mainly specified in Social Science data analysis and treatments. The analysis of the students interrogated show their levels in language proficiency, their familiarity with AI, types of AI they know or use, frequency in use. They are also interrogated in the eventual impacts of the use of this technology, the various effectiveness of its use in vocabulary, grammar, pronunciation, conversation, personal learning, assessments and feedbacks. The benefits and challenges related to this new technology are at the same time discussed along the survey. While the interrogation for the teachers are equally held in the same way, though mainly dedicated in their English teachings.

IV. Result and Discussion

4.1 Findings from the Student Surveys

a. English Proficiency and AI Familiarity

67% of the students reported being at an intermediate level in English, while 32% identified as beginners. Only 1% considered themselves advanced. Regarding their familiarity with AI, the majority (93%) stated they were "somewhat familiar" with the tool.



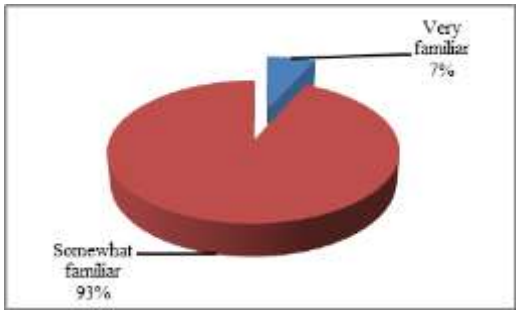


Figure 4. *Students' English Proficiency Level* ***Figure 5.*** *Students' Familiarity with AI*

b. AI Usage and Understanding

90% of the surveyed students reported having used AI tools for their English learning, while 10% had never used them. The majority of students stated they primarily used AI for automated translation and AI chatbots. Approximately 31.7% used AI weekly, 21.7% daily, 10% monthly, and 36.7% rarely.

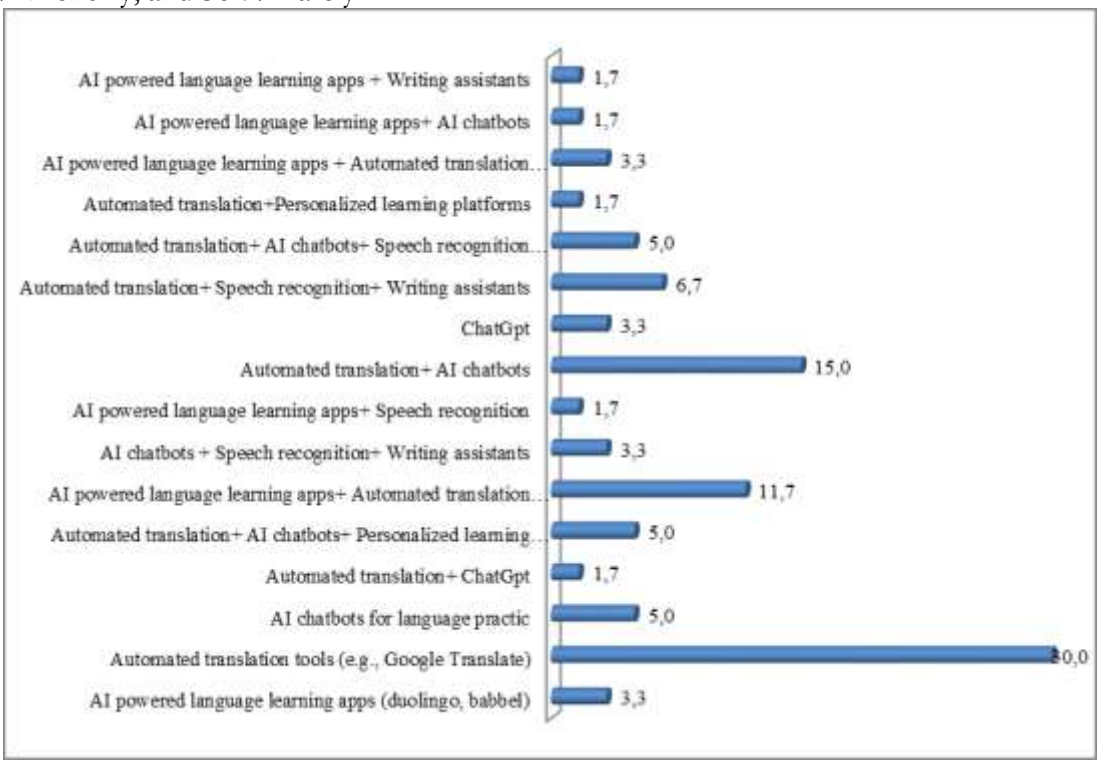


Figure 6. *Students' Use and Understanding of AI*

c. Impacts and effectiveness

36% of the surveyed students reported that AI "somewhat improved" their English learning, while 19% claimed it "significantly enhanced" their learning. Only 1% stated that AI had "no impact" on their learning.

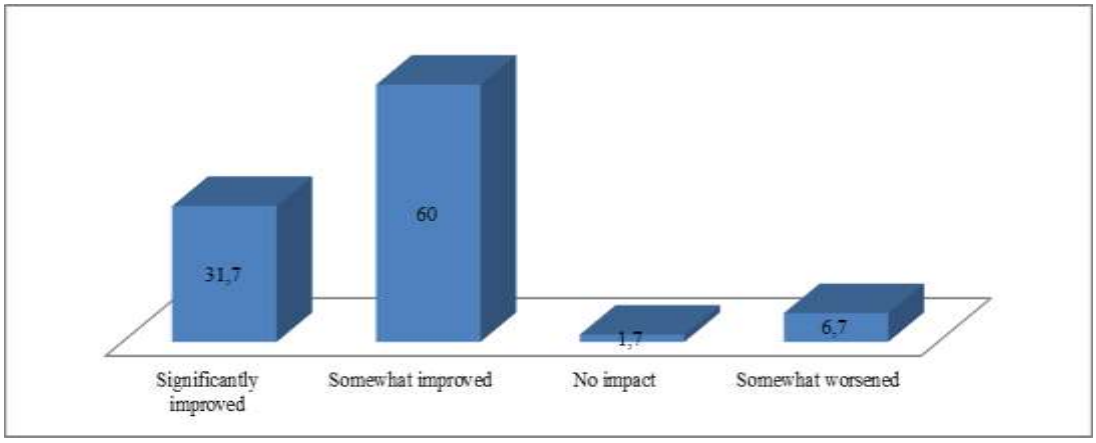


Figure 7. *Impacts of AI on English Learning and Teaching*

The use of AI is considered "somewhat effective" for acquiring and expanding vocabulary (15%), while it is "effective" for personal learning (66.7%) and "very effective" for personal learning (20%). Additionally, AI is deemed "effective" for assessment and feedback (56.7%) and "very effective" (15%).

Table 3. Effectiveness of AI in English Learning and Teaching

Effectiveness	Vocabulary	Grammar	Pronunciation	Conversation	Personal learning	Assessment/ Feedback
Very effective	15,0	10,0	8,3	10,0	20,0	15,0
Effective	78,3	73,3	51,7	65,0	66,7	56,7
Neutral	6,7	15,0	36,7	21,7	13,3	26,7
Ineffective	0,0	1,7	3,3	3,3	0,0	1,7
Total	100,0	100,0	100,0	100,0	100,0	100,0

d. Benefits and Challenges of Using AI in English Learning

The surveyed students indicated that the primary benefits they gain from using AI are "personalized learning" (25%) and "personalized learning" with "feedback" (15%). Some students also mentioned that AI helps "save time"(6.7%).

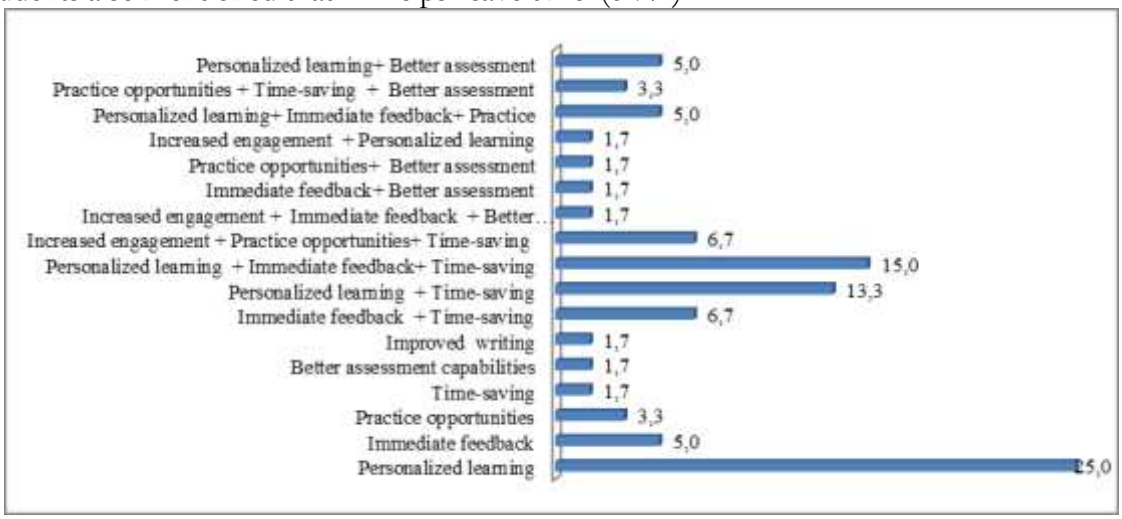


Figure 8. *Benefits of Using AI in English Learning*

Challenges stem from "limited access to technology" (20%), "limited effectiveness" (13.3%), and "technical issues" (10%). The remaining challenges are related to the "high cost of technology" in the country and the "lack of training".

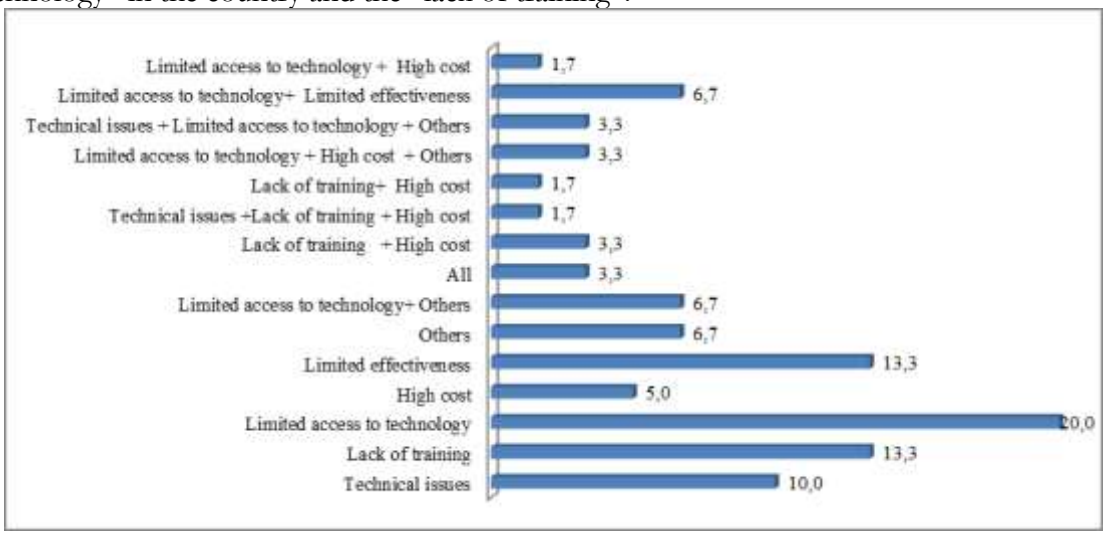


Figure 9. *Challenges of Using AI in English Learning*

4.2 Findings from the Teacher Surveys

a. Familiarity and Usage

Around 50% of the surveyed teachers reported being "somewhat familiar" with the use of AI in their English teaching, while 25% stated they are "very familiar" with it, and the same percentage said they are "not familiar". Additionally, 58.3% of the teachers indicated they "use" this new technology, while 41.7% "do not".

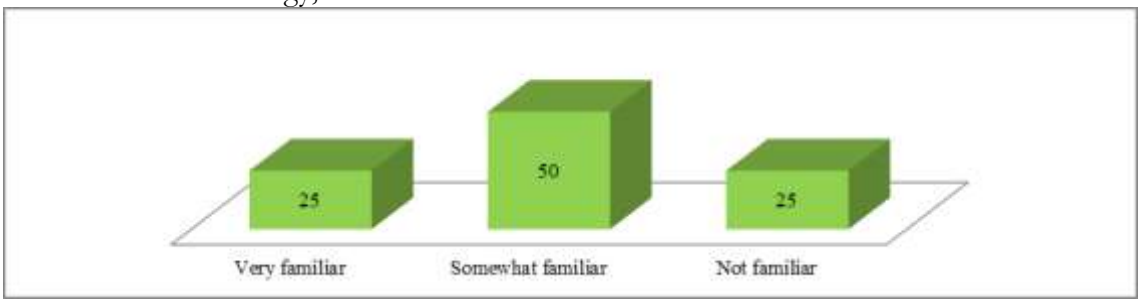


Figure 10. *English Teachers' Familiarity with AI*

b. Impacts and effectiveness in teaching

The use of AI "somewhat improved" the English teaching of the surveyed teachers, while 25% stated it could even "worsen" the system. On the other hand, 8.3% claimed there is "no impact" or effect on their teaching.

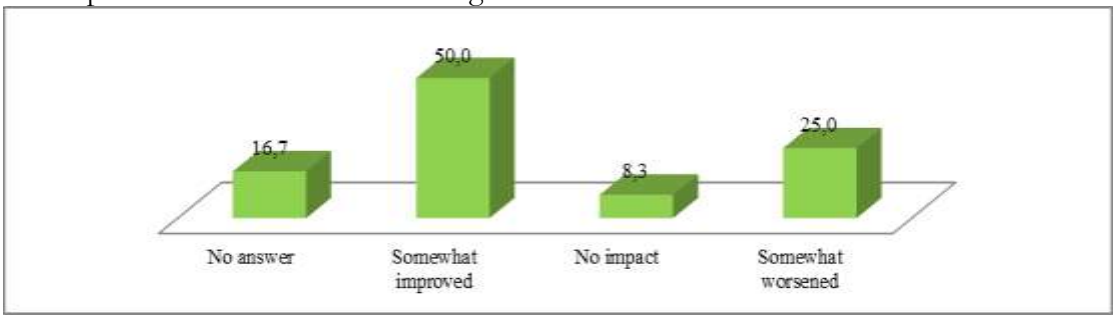


Figure 11. *Impacts of AI Use in Teaching*

In terms of effectiveness, 41.7% of the surveyed teachers believe AI is "effective" for acquiring or expanding vocabulary, while 16.7% consider it "very effective". For improving pronunciation, 33.3% find it "effective". Additionally, 16.7% stated that AI is "very effective" for personal learning, and 25% believe it is "effective" for assessment and feedback.

Table 4. Effectiveness of AI Use in Teaching

Effectiveness	Vocabulary	Grammar	Pronunciation	Conversation	Personal learning	Assessment/ Feedback
No answer (%)	16,7	16.7	16,7	16,7	16,7	16.7
Very effective (%)	16,7	0	8,3	8,3	16,7	0
Effective (%)	41,7	16,7	33,3	16,7	16,7	25,0
Neutral (%)	25,0	58,3	41,7	41,7	50,0	50,0
Ineffective (%)	0	8,3	0	16,7	0	8,3
Total (%)	100,0	100,0	100,0	100,0	100,0	100,0

c. Benefits and challenges in use of AI in English teaching

The benefits of using AI in English teaching and learning include personalized learning, immediate feedback, and time-saving (25%). Additionally, teachers noted its benefits in language practice.

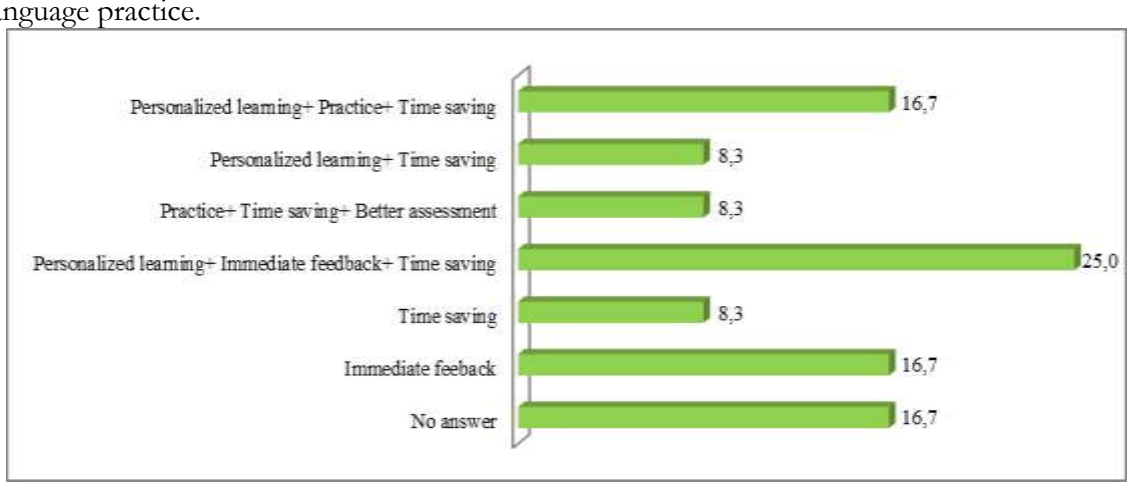


Figure 12. *Benefits of AI in English teaching*

However, some issues arise from technical difficulties, limited access, resistance to technology, and its high cost (16.7%). A few teachers also mentioned a lack of training in using AI for English teaching. Surprisingly, 25% of them chose not to share their views on the issues.

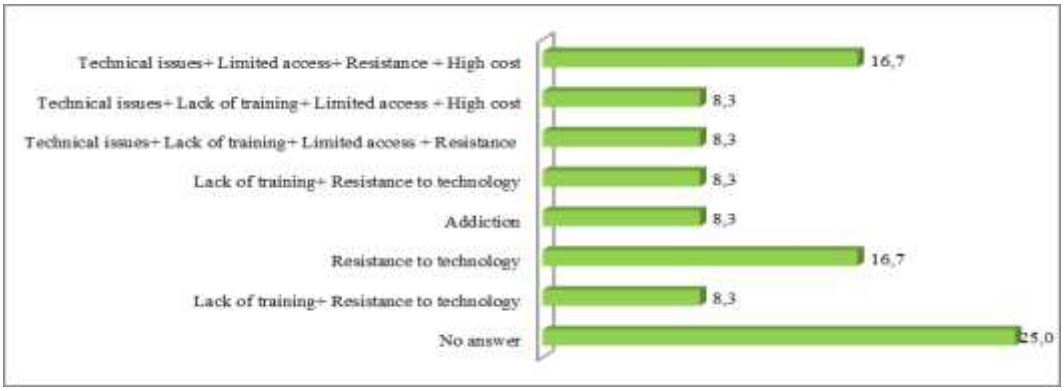


Figure 13. *Challenges of AI in English teaching*

4.2 Discussions

a. Students' Perspectives on AI Use in English Learning

1) English Proficiency and AI Familiarity

The majority of students (67%) perceiving their English proficiency as intermediate while nearly a third (32%) classify themselves as beginners and only a marginal 1% consider themselves advanced highlight a general tendency toward mid-level competency. These findings suggest that most of Malagasy engineering students in the University of Vakinankaratra and those from the ENS possess a functional command of English but still encounter challenges in more complex linguistic contexts. Despite studying English for nearly a decade in school, many Malagasy learners still struggle to attain fluency and full mastery of the language. This challenge is closely linked to Madagascar's historical and linguistic context as a former French colony, where French has remained dominant in education, administration, and daily life, while E

The linguistic landscape in Madagascar further complicates English is primarily treated as a foreign language. ish acquisition. The country's education system has alternated between French and Malagasy as the primary languages of instruction, often limiting the presence and practical use of English. As a result, English remains less accessible in everyday contexts, making it more difficult for learners to develop proficiency beyond the classroom.

This linguistic environment, particularly in rural areas, impacts English adoption due to limited immersion opportunities (Andrianjary et al., 2023).The situation reflects broader postcolonial trends, where the pursuit of global languages like English can overshadow local linguistic development (Phillipson, 2006). Learners may experience psychological barriers and lack of motivation when studying a non-native language, as observed in Anglophone African countries learning French. These factors contribute to difficulties in mastering English despite years of study.

To address these challenges, consideration of rural teaching contexts and new pedagogical approaches may be necessary to improve English language acquisition in Madagascar (Andrianjary et al., 2023).

A significant majority—93% of respondents—indicated that they have at least some awareness of AI. This suggests that AI-related concepts and tools are widely recognized among students. However, this does not necessarily mean that all of them possess an in-depth understanding or hands-on experience with these technologies as the case of Malagasy students.

Internet access plays a crucial role, as students who have regular connectivity are more likely to encounter AI-driven applications, whether through social media, online learning platforms, or search engines. Additionally, the availability of digital devices such as iPhones, tablettes, and computers further facilitates exposure to AI, as these tools often incorporate AI-powered features like virtual assistants, predictive text, or personalized recommendations. However, financial constraints presents a limiting factor—students with limited resources may have restricted access to high-quality devices or a stable internet connection, which could affect their ability to engage deeply with AI. At Malagasy universities, many students do not have consistent internet access due to financial limitations or parental restrictions on technology use.

Thus, while general awareness is high, disparities in access to technology and financial means may influence the extent of students' practical experience with AI.

2) AI Usage and Understanding

The findings reveal a high level of AI integration in English learning, with 90% of students reporting prior use of AI tools which suggests a growing reliance on technology to support language acquisition (Rusmiyanto et al., 2023); (Agrawal, 2024). The primary applications—automated translation and AI chatbots—indicate that students leverage AI for both comprehension and interactive practice. Most students tend to make translations in French or Malagasy, which is why they use a lot of automated translations. French is a dominating language in the university environment.

However, usage frequency varies significantly; while 21.7% engage with AI tools daily and 31.7% use them weekly, a substantial 36.7% report rare usage, and 10% only engage on a monthly basis. This disparity suggests that while AI tools are widely recognized as beneficial, factors such as accessibility, perceived effectiveness, or personal learning preferences may influence the frequency of use. Limited technical and material resources, access to technology, as well as internet connectivity and electricity shortages are among the challenges that hinder Malagasy students from fully utilizing AI in their English learning.

3) Impacts and Effectiveness

AI plays a meaningful role in English learning, with 55% of students acknowledging its impact—whether moderate (36%) or significant (19%)—while only a negligible 1% reported no effect. This indicates a general positive perception of AI's usefulness in language acquisition. In terms of specific benefits, AI appears particularly valuable for personalized learning, as 66.7% of students found it "effective" and 20% considered it "very effective". This highlights AI's potential to tailor learning experiences to individual needs, which aligns with previous research on adaptive learning technologies. While vocabulary acquisition was rated as only somewhat effective (15%), AI's role in assessment and feedback received strong support, with 56.7% finding it "effective" and 15% "very effective". This suggests that AI is increasingly being integrated into evaluation processes, potentially enhancing self-directed learning (Agrawal, 2024).

However, variations in effectiveness ratings imply that while AI enhances certain aspects of learning, its impact may depend on how it is utilized and the specific tools employed. Further research could examine which AI-driven methods yield the most significant learning improvements for Malagasy university students.

4) Benefits and Challenges

The findings highlight that personalized learning is the most significant advantage students perceive in using AI, with 25% valuing its adaptability and an additional 15% appreciating AI's ability to provide both personalization and feedback. This suggests that AI tools are primarily used to tailor learning experiences to individual needs, reinforcing their role in self-directed education (Agrawal, 2024); (Rusmiyanto et al., 2023). A smaller percentage (6.7%) noted time-saving as a benefit, indicating that while AI can enhance efficiency, it may not be the primary motivation for its use.

However, several challenges hinder AI's effectiveness in education. Limited access to technology (20%) emerges as the most prominent barrier, reflecting broader digital divide issues. Additionally, 13.3% of students perceive AI as having limited effectiveness, suggesting that either the available tools do not fully meet their learning needs or that their potential is not yet fully realized. Technical issues (10%) also present difficulties, likely related to connectivity, device compatibility, or software limitations which is most the case for Malagasy students who always have material issues. Beyond these, high technology costs and a lack of training further exacerbate accessibility challenges, pointing to structural barriers that need to be addressed for more equitable AI integration in education. These findings underscore the need for improved infrastructure, training initiatives, and cost-effective AI solutions to maximize its benefits in language learning.

4.3 Teachers' Perspectives on AI in English Teaching

a. Familiarity and Usage

The findings indicate a varying level of familiarity with AI among English teachers, with approximately half (50%) reporting being "somewhat familiar"; while an equal distribution (25%) exists between those who are "very familiar" and those who are "not familiar at all". This suggests that while AI awareness is growing, a significant portion of teachers may still lack sufficient exposure or training in its use. In Madagascar, and mainly in rural areas, the access to technology or electricity can be a big hinder to teaching/learning a foreign language, especially for English as a foreign language (Andrianjary et al., 2023).

Regarding actual AI usage, 58.3% of teachers incorporate AI into their teaching, whereas 41.7% do not. This indicates that despite varying levels of familiarity, more than half of the teachers actively engage with AI tools, potentially leveraging them for lesson planning, assessment, or interactive learning. However, the relatively high percentage of non-users suggests that barriers such as limited access, lack of institutional support (technical tools as computers, iPhones etc.), or uncertainty about AI's effectiveness may still be present. These findings highlight the need for targeted professional development programs and institutional support to enhance AI integration in English language teaching.

b. Impacts and Effectiveness

While AI has a generally positive impact on English teaching, perceptions of its effectiveness remain divided. A majority of surveyed teachers acknowledged that AI "somewhat improved" their teaching, yet a notable 25% expressed concerns that it could "worsen" the system. This skepticism may stem from potential challenges such as over-reliance on technology, reduced teacher control, or inconsistencies in AI-generated content (Godwin-Jones, 2022); (Huang et al., 2023). Other issues include the need for human interaction, understanding cultural nuances, and addressing ethical concerns surrounding data privacy (Seventilofa, 2024). Additionally, 8.3% of teachers reported no impact, indicating that AI integration may not universally translate into tangible teaching improvements.

Regarding effectiveness, AI appears particularly useful for vocabulary acquisition, with 41.7% of teachers considering it "effective" and 16.7% viewing it as "very effective". This suggests that AI-driven tools such as automated translation and word prediction can enhance vocabulary learning. For pronunciation improvement, 33.3% of teachers find AI "effective", which reflects the growing adoption of AI-powered speech recognition tools in language education. AI-powered tools, including speech recognition technology and chatbots, have shown significant effectiveness in enhancing learners' pronunciation accuracy and speaking skills (Mohammadkarimi, 2024); (Hoang et al., 2023). Applications like Google Read Along and Fluenti have demonstrated positive impacts on students' pronunciation, with experimental groups outperforming control groups (Abimanto & Sumarsono, 2024); (Hoang et al., 2023). Learners generally reported favorable attitudes towards AI-driven tools, citing improved confidence and engagement (Mohammadkarimi, 2024). The instant feedback provided by these applications allows students to recognize and correct errors directly (Abimanto & Sumarsono, 2024)

Furthermore, AI is perceived as beneficial for personal learning (16.7% very effective) and assessment and feedback (25% effective), reinforcing its role in adaptive learning and automated evaluation. AI-enhanced adaptive learning systems tailor instruction to individual needs, providing real-time feedback and personalized learning paths (Katonane Gyonyoru & Katona, 2024).

However, the variation in effectiveness ratings suggests that while AI offers promising advantages, its impact may depend on factors such as the specific tools used, teachers' familiarity with them, and institutional support.

c. Benefits and Challenges

The findings indicate that AI offers several advantages in English teaching and learning, with key benefits including personalized learning, immediate feedback, and time-saving, as reported by 25% of the respondents.

AI is transforming English language teaching and learning by offering personalized experiences, immediate feedback, and time-saving benefits. AI-driven tools adapt to individual learners' needs, promoting engagement and proficiency development (Umar, 2024). Applications like Duolingo and Babbel use machine learning algorithms to tailor exercises, while tools like Grammarly provide real-time feedback on writing (Agrawal, 2024).
Additionally, teachers highlighted AI's role in language practice, reinforcing its potential to support interactive learning. AI supports teachers in planning, implementation, and assessment, providing immediate feedback and automated essay scoring (Celik et al., 2022). However, challenges remain in AI implementation and accessibility (Peña-Acuña & Corga Fernandes Durão, 2024); (Celik et al., 2022).

Despite these benefits, challenges persist. Technical difficulties, limited access, resistance to technology, and high costs were reported by 16.7% of teachers. Several challenges persist such as technical difficulties, limited access, resistance to technology, and high costs hinder AI adoption in English learning (Sabaruddin et al., 2024); (Gusman et al., 2024). These barriers reflect common concerns in AI integration, particularly in regions where digital infrastructure remains a limitation in Madagascar. Other challenges include computational issues, limited language exposure, and lack of human interaction (Gusman et al., 2024). English language exposure is one of the major concerns in a French speaking country like Madagascar. The lack of training was also identified as a constraint, suggesting

that while AI holds promise, its effective implementation requires professional development initiatives To address these issues, researchers recommend focusing on teacher training, establishing ethical standards, and implementing blended learning models (Kristiawan et al., 2024).

25% of the teachers refrained from sharing their perspectives on the challenges, which may indicate uncertainty, lack of experience, or hesitancy in expressing critical views on AI. These findings highlight the need for improved infrastructure, training programs, and policies to facilitate AI integration while addressing existing concerns.

Challenges remain, including ethical concerns about data privacy, the need for teacher training, and issues with accuracy and institutional resistance (Madjid, 2022); (Evenddy, 2024).

V. Conclusion

This research highlights the growing role of artificial intelligence in the learning and teaching of English, particularly among engineering students at the University of Vakinankaratra, ENS students, and English teachers in Antananarivo. By exploring the interaction of these groups with AI-based tools, it reveals the effectiveness of this technology in improving English proficiency, while also highlighting the challenges associated with its integration into the Malagasy educational system.

The central question addressed was: "How can Artificial Intelligence be utilized to transform English language learning/teaching by offering diverse learning opportunities and improving the educational experience for both students and teachers?" The hypothesis suggested that: "Integrating Artificial Intelligence can significantly improve students' proficiency in the English language."

The research involved students from levels 1 and 2, from various specialties such as Textile Sciences and Techniques, Electromechanical Engineering, Rural Engineering, and ENS, as well as English teachers in secondary, university, and public sectors. The results show that, while the majority of students and teachers are familiar with AI, its use remains uneven due to various factors such as limited access to tools, insufficient training, and technological disparities. For students, AI proves particularly useful for personalized learning, vocabulary acquisition, and assessment. However, obstacles such as high internet costs, technical limitations, and resistance to adopting technology hinder its optimal use.

Despite these challenges, AI offers considerable potential for improving English teaching in Malagasy universities. It provides adaptive learning experiences, promotes pronunciation and fluency practice, and offers immediate feedback to learners. However, to maximize its impact, it is crucial to overcome infrastructure constraints, strengthen teacher training, and ensure equitable access to educational technologies.

Future research could explore the long-term effects of AI on learners' language development, as well as the most effective strategies for integrating AI into resource-limited educational contexts. It would also be relevant to examine the impact of AI on teachers' pedagogical methods and classroom interaction dynamics, in order to better understand how this technology can sustainably transform English learning.

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