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The Role of Artificial Intelligence-Based Technology in English Teaching and Learning

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ABSTRACT: Artificial Intelligence (AI) simulates human intelligence through computer systems, designed to replicate human-like functioning. As a pivotal driver of the 4.0 industrial revolution, AI is transforming education, particularly in teaching and learning processes. This study examines the role of AI in English Language Teaching (ELT) and explores various AI technologies integrated into the field. Through library research, the findings indicate that AI fosters a conducive learning environment for English language acquisition. It effectively personalizes the learning experience, enabling students to engage with English skills—speaking, listening, reading, and writing—based on their proficiency level, vocational needs, or interests. AI-powered tools, such as real-time simulation platforms for spoken English, enhance practical skills, including writing, and boost student engagement and the overall impact of English instruction in ELT. With technological advancements, learning English has become more accessible, thanks to diverse AI-driven platforms. AI technologies facilitate understanding and skill development by offering interactive, decision-making experiences similar to human reasoning. Examples of AI-based ELT applications include Google Translate, Text-to-Speech (TTS), English Able, Orai, ELSA, chatbots, Duolingo, and Neo platforms, among others, providing students with multiple options to improve their English proficiency. This research paper aims to explore the role of Artificial Intelligence (AI) in English Language Teaching (ELT). This paper will Focusing on how use of AL technologies improves English language skills, optimize teaching methods, and create immersive, practical learning experiences.

KEYWORDS: Human creativity, artificial intelligence, , creative writing, Claude AI,

I. INTRODUCTION

The rapid pace of change in the industrial era has impacted everyone, requiring swift adaptability. Globalization and the rise of Industry 4.0 have spurred new avenues for creativity, innovation, and challenges, particularly in technology. As a result, technology has become crucial in transmitting information through text, images, and sound (Rahayu & Pujiyono, 2017). As, designed to simplify human tasks and activities, technology continues to evolve, with one of the most intensively developed fields being Artificial Intelligence (AI).

Artificial Intelligence (AI) has garnered significant attention, with ongoing advancements in computational creativity (Cheng & Day, 2014). By incorporating AI, computers are enabled to exhibit forms of creativity through various applications. Rahman (2009) describes AI as creating software that autonomously manages knowledge, computations, and search functions. This development aims to make devices “intelligent,” mimicking the human brain's functionality, as seen in online platforms and robotic systems (Karsenti, 2019). AI, also referred to as Machine Intelligence (Mehrotra, 2019), involves enhancing machines with human-like cognitive abilities for performing tasks.

Mehrotra (2019) defines AI as a field within computer science focused on designing smart systems and applications that can think and act like humans. AI technology's essence lies in replicating intelligence (Wang, 2019). Whitby (2009) highlights that AI explores intelligent behavior in humans, animals, and machines, striving to emulate and apply these characteristics.

The term "AI" itself combines “artificial”—referring to something simulated yet effective—and “intelligence,” which encompasses complex capabilities like reasoning, emotional awareness, self-understanding, and creativity (Ahmet, 2018).

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Joshi (2019) emphasizes that AI does not necessarily aim to create an all-knowing computer, but seeks to develop machines capable of human-like actions. Campesato (2020) notes that AI strives to build systems that can emulate thought processes or traits associated with human intelligence, including language comprehension, decision-making, and visual perception. There is an ongoing demand for AI to solve intricate problems and create expert systems, particularly in areas like natural language processing and recognition tasks (Devi et al., 2020). Moreover, AI has potential in education as a tireless tutor, providing personalized feedback and helping learners gain fluency in low-pressure environments.

II. METHOD

This research employs a library-based approach, focusing on the systematic collection and analysis of data from various scholarly sources to address the research problem. Library research involves a detailed and critical study of relevant texts, as it emphasizes direct interaction between the researcher and existing literature (Zed, 2004, p. 4). The analysis draws from a comprehensive examination of reference books, academic journals, and previous studies to establish a strong theoretical foundation for the research topic.

The primary sources of data for this study include books, peer-reviewed journals, and credible online resources that are relevant to the research subject. The research data consists of carefully selected scholarly materials that provide insights into the key concepts and theories being investigated. The method of data collection used is documentation, which involves gathering information from a wide range of sources, such as books, articles, research papers, newspapers, and other documented materials. The research emphasizes the evaluation of existing literature, particularly focusing on findings from scientific articles published in reputable journals.

Once the data has been collected, the next step involves a thorough analysis to derive meaningful conclusions. The researcher employs content analysis as the primary technique for data interpretation. Content analysis is a method that involves an in-depth examination of written materials, allowing for a descriptive exploration of the information. This approach ensures that the analysis is both comprehensive and accurate, facilitating a detailed understanding of the research topic and supporting the development of well-founded conclusions based on the available literature.

III. FINDINGS AND DISCUSSION: THE RELATIONSHIP BETWEEN ARTIFICIAL INTELLIGENCE AND ENGLISH LANGUAGE TEACHING

Artificial Intelligence (AI) has become an essential element in enhancing English Language Teaching (ELT). According to Mukhallafi (2020), AI-based systems facilitate teaching and learning by offering customized and flexible content that caters to the diverse needs of learners. AI's capability to simulate expert systems and automate assessment methods transforms traditional language education. Wang (2019) highlights several ways in which AI influences English teaching:

1. **AI Transforms the English Learning Environment**: AI creates an immersive and engaging atmosphere for language learners by incorporating multimedia elements like images, text, and sound, making learning more dynamic and interactive. This immersive experience enhances the authenticity of language practice, allowing learners to engage deeply with the language. Zilberman (2019) also emphasizes AI's ability to personalize learning environments, providing adult learners with tailored experiences that align with their language proficiency and professional aspirations.
2. **AI Enhances Teaching Effectiveness**: AI enables the development of realistic dialogue simulations, helping learners practice speaking, listening, and writing in contextually relevant ways. Additionally, AI can offer cultural insights into English-speaking societies, boosting students' interest and motivation. "AI-powered simulations provide learners with a safe and engaging space to practice communication skills, transforming passive learning into active participation." – **Jane Hart, Learning & Development Specialist.** (https://www.researchgate.net)
3. This cultural knowledge enriches communication skills and prepares students for real-world interactions.
4. **AI Boosts Practical Skills in ELT**: As AI becomes integral to various industries, it necessitates that both teachers and students acquire operational proficiency with these technologies. AI applications in language teaching enhance students' practical skills, equipping them to use AI tools efficiently. The ability to operate AI tools fluently has

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become as critical as learning a new language itself. AI in ELT ensures students are ready for tomorrow's challenges." – **Marc Prensky, Education Innovator** (https://www.researchgate.net)

Gawate (2019) further discusses the advantages of AI-based instructional programs in English language education:

1. **Need-Based Instructional Programs**: AI-driven tools adapt to learners' specific goals and contextual needs, providing targeted and meaningful instruction. This approach ensures that learners receive content that aligns with their expectations, fostering better engagement and outcomes.
2. **High-Quality Content Across Language Skills**: AI can generate comprehensive teaching materials that cover listening, speaking, reading, and writing, ensuring learners receive a well-rounded education. This adaptability allows for a more integrated learning experience.
3. **Support System for Teachers and Students**: AI functions as a supplementary resource for both students and educators. By offering immediate, precise assistance, AI tools complement the teaching process without replacing the teacher. Educators continue to play a crucial role as facilitators and guides, managing AI-based tools and integrating them into the curriculum.
4. **Efficient Feedback Mechanisms**: AI systems provide instant and customized feedback, enabling students to monitor their progress. These systems can grade, review, and analyze student performance, offering detailed insights to support continuous improvement.
5. **Evolving Role of Teachers**: While AI redefines the traditional role of teachers, it does not eliminate the need for human educators. Instead, teachers become mentors and directors, guiding students through AI-enhanced learning experiences. Teachers remain responsible for making adjustments to AI systems and ensuring that these technologies are effectively integrated.
6. **Global Connectivity**: AI technology overcomes spatial and temporal barriers, allowing learners to access high-quality resources from around the world. AI-powered platforms use facial and voice recognition to facilitate remote access and manage student activities, providing seamless and comprehensive learning experiences.
7. **Personalized Learning**: AI platforms customize courses based on student needs, fostering a learner-centric approach. Learners can progress at their own pace, revisit challenging topics, and engage with content that captures their interests. This tailored approach ensures that each learner receives an education that meets their unique requirements.
8. **Self-Paced Learning and Engagement**: AI-based systems encourage students to learn at their preferred speed, offering opportunities for repetition and reinforcement. By highlighting areas of difficulty and incorporating engaging activities, AI tools make language learning more accessible and enjoyable.

In summary, AI-driven advancements in ELT provide significant benefits, from creating engaging and personalized learning environments to offering efficient feedback and support systems. While AI transforms the landscape of English education, the collaboration between human teachers and AI remains vital for maximizing educational outcomes. **Language learning with AI allows us to create personalized learning experiences, adapting to each student's unique pace and style."** – Adapted from EdTech Experts (https://www.researchgate.net)

IV. ARTIFICIAL INTELLIGENCE TECHNOLOGY IN ENGLISH LANGUAGE LEARNING

Artificial Intelligence (AI) technology represents one of the most advanced innovations in information systems, enabling machines to perform tasks traditionally requiring human intelligence (Han, 2019). With rapid advancements, AI technology has significantly impacted various fields, including education, where it enhances the efficiency of teaching and learning processes, such as English language learning. As highlighted by Fryer & Carpenter (2006), AI opens new possibilities for language acquisition and instruction. ∟ "By incorporating AI, learners can practice authentic conversational skills, enhancing their confidence and readiness for real-life situations." – **Dr. Stephen Krashen, Linguist** https://www.researchgate.net ›

Luo & Cheng (2020) emphasize that AI is transforming foreign language teaching by addressing common challenges, including limited instructional time, constrained physical space, resource scarcity, and traditional, monotonous assessment methods. Thornton (2007) defines AI as a comprehensive scientific domain focused on problem-solving and imitating human-like reasoning and behavior. According to Cobar (2019), AI technology integrates dynamic capabilities to address complex issues, facilitating tasks like language instruction.

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The primary aim of AI is to create intelligent systems capable of mimicking human cognitive processes, making decisions, and learning from data patterns. Salvaris et al. (2018) explain that AI systems process extensive data through algorithms, allowing them to learn and adapt automatically. The field of AI encompasses various sub-disciplines, including machine learning, neural networks, cognitive computing, computer vision, and natural language processing. These components work together to develop systems that can process and understand human languages, a complex task given the intricacies of natural communication (Nilsson, 2014).

AI technology's influence on English language teaching has been profound. Digital platforms powered by AI have made language learning more accessible and effective, combining language literacy with digital proficiency to enhance global communication skills. As AI systems become more sophisticated, they improve their accuracy and ability to process and understand languages, making them invaluable tools for language instruction (Yingsoon, 2021).

AI facilitates English learning by offering personalized and interactive learning experiences. It enhances the ability to convey complex information and supports self-paced learning. The availability of diverse AI-powered educational tools simplifies the learning process for students, even without direct teacher interaction. AI-based platforms, applications, and software provide comprehensive resources for both learners and educators, creating an adaptable and engaging learning environment.

AI technology enables students to access various applications tailored to language acquisition. These applications use AI algorithms to analyze language patterns, provide instant feedback, and adapt content to the learner's level and preferences. By automating certain aspects of teaching, AI allows educators to focus on more personalized instruction, guiding and supporting students while optimizing their learning outcomes.

Moreover, AI-driven language learning tools incorporate advanced features like speech recognition and real-time language translation, making English language learning more interactive and accessible. These tools facilitate immersive experiences that cater to different learning styles and needs. Consequently, AI's integration into English language education supports efficient skill development, promotes global competence, and offers innovative solutions to traditional teaching limitations.

V. ARTIFICIAL INTELLIGENCE TECHNOLOGY IN ENGLISH LANGUAGE LEARNING

Artificial intelligence (AI) has rapidly transformed the landscape of language learning, offering innovative solutions to both teachers and learners. The integration of AI in education has facilitated personalized learning experiences, improved accessibility, and enhanced efficiency in mastering a language. As technology continues to evolve, various AI tools have emerged, making English language learning more interactive and adaptable to the needs of learners. As it is said,"**AI offers infinite possibilities in English teaching, but it also reminds us to ask: What kind of communication do we truly value?"(**www. article/how-ai-powered-learning-analytics-are-shaping-early-childhood-education-and-instruction). This section explores some of the key AI technologies that are revolutionizing the way English is taught and learned.

1. GOOGLE TRANSLATE

One of the most widely used AI tools for language learning is **Google Translate**. Google has developed a comprehensive suite of tools, with Google Translate standing out as one of the most significant contributions for language learners. It allows users to translate text between over 100 languages, making it accessible for learners worldwide (Smallwood, 2015). Google Translate can convert entire documents, translate websites, and even offer pronunciation features, helping learners with both written and spoken English (Covili, 2016). It also provides a mobile app, enabling users to translate street signs and spoken language in real time.

For English language learners, Google Translate serves as an essential tool for understanding words, phrases, and sentences in a different language. It helps students check their spelling and pronunciation, making it an invaluable resource for learners, especially those who do not have immediate access to teachers. Google Translate's integration with voice recognition further enhances its utility, allowing learners to hear correct pronunciation, which is crucial for improving speaking skills.

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2. Text-to-Speech (TTS)

Another AI-powered feature that complements language learning is **Text-to-Speech (TTS)** technology. TTS systems convert written text into spoken words using synthetic voices. Google Translate, for example, incorporates TTS to read translations aloud in a variety of languages, including English. This feature allows learners to hear proper pronunciation, including intonation and accent, providing valuable auditory input for non-native speakers.

TTS technology can be highly beneficial for English learners, especially in reinforcing correct pronunciation and improving listening skills. It allows students to adjust the speed and tone of the audio, enabling them to hear words at their preferred pace. Additionally, TTS is an effective tool in English language laboratories, where students can practice listening and speaking skills independently (Yudhistiro, 2016). By offering customized pronunciation, TTS helps learners refine their language abilities, making the process more efficient and accessible.

3. English Able

English ABLE (Assessment-Based Learning Environment) is an AI-powered platform designed to enhance English grammar learning. Developed by Zapata-Rivera et al. (2007), this technology focuses on assessment-driven instruction. It uses both formative and summative assessments to guide students in their learning process, adapting content to their specific needs. English ABLE offers adaptive learning environments, which are particularly useful for English language learners (ELLs), who need individualized attention to master complex grammatical concepts.

By utilizing TOEFL CBT job libraries, English ABLE generates personalized assignments for students, targeting areas where they need improvement. This tailored approach ensures that learners receive focused support, increasing their understanding of English grammar and language structure. The adaptability of this system makes it an invaluable tool for language learners, providing a scaffolded learning experience that grows with their skill level.

4. Orai

Orai is an AI application designed to help learners improve their speaking and public speaking skills. This app analyzes speech patterns to detect how many words are spoken, identifies filler words, and offers feedback on overall speaking proficiency. Orai is particularly beneficial for language learners who wish to improve their fluency and reduce speaking anxiety. It provides a self-directed learning environment where users can practice speaking and receive immediate feedback.

In the context of English language teaching, Orai helps students practice pronunciation and fluency. Teachers can integrate Orai into their lessons, allowing students to practice speaking tasks such as describing people or events. The app provides lessons, progress tracking, and recordings that help learners track their speaking improvement over time (Suryani et al., 2019). By offering instant feedback, Orai creates an engaging and interactive learning environment, boosting learners' confidence and improving their spoken English.

5. ELSA (English Learning Speech Assistant)

ELSA (English Learning Speech Assistant) is an AI-driven application that uses speech recognition technology to help learners improve their English pronunciation. Designed by Vu Van in 2015, ELSA assesses the user's speech and provides corrective feedback based on native speaker patterns. The app uses a database of voice data from non-native speakers, enabling it to offer personalized feedback and suggest specific lessons to improve weak areas in pronunciation.

ELSA's unique feature is its ability to assess learners' proficiency levels by scoring their pronunciation on a scale from 0 to 100, with native speakers typically scoring above 95. This score helps tailor the learning experience, highlighting areas that need improvement. By providing a two-way learning process, ELSA offers immediate corrective input after learners pronounce words or sentences, enhancing their speaking accuracy and confidence (Eka, 2020). For English learners, ELSA is an excellent tool to perfect pronunciation, especially for non-native speakers who may struggle with specific sounds or accents.

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6. Chatbots

Chatbots represent another innovative use of AI in English language learning. Chatbots are AI-powered conversational systems designed to simulate human conversation. They can communicate with users in written or spoken form, making them ideal tools for practicing English conversation. Studies have shown that chatbots can effectively assist learners in improving their conversational skills by providing instant feedback and grammar correction (Nghi et al., 2019).

In the context of English language learning, chatbots serve as virtual conversation partners, allowing learners to practice speaking and writing in a low-pressure environment. These systems use natural language processing (NLP) to interpret and respond to users' input. By correcting grammar errors and offering suggestions, chatbots help learners refine their English sentence structure and fluency. Additionally, chatbots provide daily logs that track a learner's progress, allowing users to measure how much they've improved in conversational English (Haristiani, 2019). Chatbots provide an interactive, accessible, and engaging method for practicing English, especially for learners who may not have opportunities to engage in real-world conversations.

7. Duolingo

Duolingo is a popular language-learning app that uses AI to offer personalized learning experiences. This app gamifies the language-learning process by presenting challenges that learners must complete to advance to the next level. Duolingo assesses the learner's proficiency level through a placement test and tailors the learning material to match their abilities. The app focuses on vocabulary, grammar, and sentence structure, providing a well-rounded approach to language acquisition.

For English learners, Duolingo offers a comprehensive method for improving language skills in a fun and interactive way. The app encourages users to complete lessons and practice regularly, providing feedback after each task to help learners understand their mistakes. Duolingo's competitive, game-like structure motivates learners to continue practicing and improving their skills, making it an engaging tool for both beginners and advanced learners.

8. Neo

Neo is an AI-powered language learning system developed by Nexgen English Online Co. It offers an integrated learning solution through a mobile app, allowing learners to study English at their own pace. Neo uses voice recognition technology to help users improve their pronunciation, offering instant feedback and adaptive learning based on their progress. The AI system continually analyzes user data to provide content that suits the learner's level, ensuring that they receive the appropriate challenges to enhance their language skills.

For English language learners, Neo provides a flexible, user-friendly interface and adaptive learning system that adjusts as learners progress. The app's speech recognition feature ensures that users can master English pronunciation by receiving personalized corrections based on their speaking patterns. Neo's AI-driven approach creates a dynamic and efficient learning environment, helping users improve their English skills more effectively and quickly.

VI. BENEFITS OF AI IN ENGLISH LANGUAGE LEARNING

The integration of AI in English language learning brings several key benefits. First, AI tools can provide immediate and detailed feedback, helping learners identify areas for improvement and track their progress. Unlike traditional methods, AI-powered systems can assess language proficiency down to the phoneme level, offering a level of precision that is difficult for human teachers to achieve (Yingsoon, 2021). Additionally, AI tools are accessible at any time and from anywhere, making them highly convenient for learners who may not have regular access to teachers or classrooms. "The English teacher of the future isn't one who competes with AI, but one who collaborates with it to unlock the full potential of learners." (www.future-education-how-artificial-intelligence-transforming)

AI also enhances scalability, allowing educators to reach a larger number of students. While human teachers can only attend to a limited number of learners, AI systems can serve a virtually unlimited number of students simultaneously, providing personalized instruction at scale. This makes AI-powered language learning tools more efficient and effective, particularly in large classrooms or online learning environments.

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Furthermore, AI-driven tools create a pressure-free learning environment, which is particularly beneficial for learners who may feel self-conscious about their speaking abilities. AI applications like chatbots, Orai, and ELSA provide a safe space for learners to practice speaking without fear of judgment, increasing their confidence and encouraging consistent practice.

VII. CONCLUSION

AI technologies are significantly reshaping the way English is taught and learned, offering innovative solutions that enhance both teaching efficiency and student engagement. Tools such as Google Translate, TTS, ELSA, chatbots, and Duolingo provide personalized learning experiences, making it easier for learners to acquire English language skills at their own pace. As AI continues to advance, the potential for transforming language education is immense, offering learners more accessible, efficient, and effective ways to master English.

In conclusion, artificial intelligence aims to replicate or surpass human intelligence, facilitating tasks such as natural language processing, reasoning, perception, and decision-making. This technology is designed to enhance efficiency and reduce the time required for various activities. The advancement of AI, particularly in language learning, has made mastering English easier and more accessible. Digital platforms powered by AI offer personalized learning experiences, adapting to the individual needs and schedules of users. As, AI continues to evolve, it will expand opportunities for language learners worldwide, making education more efficient and tailored to each learner's unique requirements.

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