

إدماج الذكاء الاصطناعي في تعليم اللغة الإنجليزية

The Integration of Artificial Intelligence in Language Education: A Comprehensive Overview

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الملخص باللغة العربية

تُقدّم هذه الورقة تحليلاً متعمقاً في تعليم اللغة باستخدام الذكاء الاصطناعي (AI)، روبوتات الدردشة، والواقع الافتراضي (VR)، والترجمة الآلية، وأنظمة التعرف على الصوت، مع تسليط الضوء على قدرتها لتعزيز اكتساب اللغة. كما تناقش الورقة- أيضاً- فوائد استخدام الذكاء الاصطناعي في تعليم اللغة، بما في ذلك تجارب التعلم الشخصية، وزيادة المشاركة، وطرق التقييم الفعالة، بالإضافة إلى ذلك فهي تعالج التحديات المرتبطة بدمج الذكاء الاصطناعي في فصول اللغة، وأخيراً، تختتم الورقة بعرض أهم النتائج التي توصل إليها الباحثون لتعزيز الممارسات التربوية الفعالة وسبل التوجهات البحثية المستقبلية.

Abstract:

This paper provides an in-depth analysis of the use of Artificial Intelligence (AI) in language education. It explores various AI technologies, such as chatbots, virtual reality (VR), augmented reality (AR), machine translation (MT), and voice recognition systems, highlighting their potential to enhance language acquisition. The paper discusses the benefits of using AI in language education, including personalized learning experiences, increased engagement and effective assessment methods. Additionally, it addresses the challenges associated with integrating AI in language classroom. Finally, the paper concludes by offering the important findings for promoting effective pedagogical practices and avenues for future research directions.

Keywords: Artificial Intelligence, (AI), language teaching, language learning, chatbots, virtual reality, augmented reality, machine translation, voice recognition, personalized learning, engagement, assessment

1. Introduction

Language education has witnessed significant advancements through the integration of Artificial Intelligence (AI) technologies. AI-powered tools offer opportunities to enhance language acquisition by providing

personalized learning experiences, fostering engagement, and improving assessment methods. This paper aims to critically analyze the use of AI in language education, identifies its benefits, and discusses the challenges associated with its implementation.

In fact, English language competency has become crucial for people looking to succeed in a variety of social, academic, and professional contexts in today's globally connected world. Proficiency in English communication gives access to worldwide collaboration, education, and job opportunities (Sari, 2021). Researchers and educators are looking at new ways to improve language learning outcomes as the need for proficiency in the English language, keeps rising. One strategy that has garnered significant interest is the incorporation of AI technologies into the teaching of English language. Nowadays, chatbots and artificial intelligence (AI) are gaining popularity. They are being used extensively in a variety of industries, including e-commerce, healthcare, and education (. Pérez, et al., 2020; Hwang & Chang, 2021). Over the past few decades, chatbot technology has rapidly advanced, because of recent developments in machine learning and natural language processing (NLP) (Caldarini, et al., 2022; Luo, et al., 2022).

Contemporary chatbots, on the other hand, have added additional features including context awareness, multi-turn capabilities, omnichannel deployment, personalized interaction, voice recognition and synthesis, and connectivity with third-party apps (Caldarini, et al., 2022; Adamopoulou, et al., 2020; Okonkwo & Ade-Ibijola, 2021). Because of this, a vast array of chatbots are now available that are integrated in various ways into various electronic devices, programs, and applications. Examples of these include social networks (Instagram, Facebook Messenger, Twitter), video games and gaming platforms (Xbox, Roblox), and messaging apps (Whatsapp, Telegram, Kik, Slack). In actuality, there are very few industries in which chatbots are not currently or won't be used in the near future.

By utilizing web-based learning platforms or online learning, students can access the materials from any location in the globe. Additionally, by utilizing AI capabilities like language translation tools, students can customize their learning to best fit their unique learning styles.

In a similar vein, AI has enhanced the educational experiences of learners by making it possible to tailor and customize course materials to each student's

requirements and skills. AI has, all things considered, had a significant impact on education, especially on areas of learning that are specific to individual learning institutions or the administration, instruction, and learning areas of the education sector (Chen, Chen and Lin, 2020).

AI in education has also eliminated some barriers to access to learning opportunities, such as national and international borders, enabling global access to learning through online and web-based platforms (Sharma et al., 2019; Mikropoulos and Natsis, 2011). Additionally, the use of (AI) in education has removed geographical and national boundaries as well as other obstacles to learning, allowing for worldwide access to education via online and web-based platforms.

2. AI Technologies in Language Education

2.1 Chatbots

A Chatbot (or ChatGPT) simulates human conversations and interact with learners, delivering instant feedback, guidance, and language practice. It can be programmed with customized exercises, vocabulary quizzes, and dialogue simulations to improve learners' oral and written skills.

In fact, ChatGPT is certainly one of the most revolutionary AI tools created in recent years. It offers organizations, societies, and individuals significant opportunities as well as challenges. Generative AI tools can significantly increase productivity in many contexts, but these tools also pose certain practical, moral, ethical, and policy issues (Dwivedi et al, 2023). For example, the lack of established norms and ethical codes around generative AI is one of the well-known issues with ChatGPT in the education sector. One of the most significant practical obstacles that regulators encounter is the inability to impose legal penalties on anyone who intentionally misuse or abuse these capabilities. Therefore, new rules governing these tools must be passed. Because of their worldwide scope, international collaboration is also required to optimize the advantages of products like ChatGPT (Dwivedi et al, 2023).

2.2 Virtual Reality (VR)

Virtual reality (VR) is a technology that replicates a computer-generated three-dimensional setting that might be accessed by various immersive devices. This technology creates a synthetic environment that can either be wholly unlike or identical to the real world (Jensen & Konradsen, 2018). VR creates immersive language learning environments where learners can

practice real-life conversational situations. Through virtual simulations, students can interact with virtual characters, explore places digitally and engage in cultural exchanges, which, in turn, leads to effective improvement in their language proficiency.

It has also been discovered that VR successfully immerses learners in immersive settings and enriches the learning context with entertaining elements. Nevertheless, issues related to expenses, large headsets, and technological problems were also discovered (Żammit, Jacqueline 2023).

The findings of Żammit's study (ibid) suggest that one of the most beneficial approaches of teaching and learning languages in the future may be VR. Żammit's study also found that there are a number of problems with VR, such as technical difficulties, the need for VR apps to be improved, and financial concerns. Nonetheless, it demonstrated how VR may be used to produce a completely immersive language learning environment.

2.3 Augmented Reality (AR)

With the use of augmented reality technology (AR), users can engage with computer-generated content in a real-time, physical setting by fusing digital and physical content. With AR, users can view virtual objects, images, or information superimposed on the real world by wearing or using devices like smartphones, tablets, or headsets.

By offering immersive and dynamic learning environments, augmented reality and virtual reality technologies have the potential to completely transform language learning. Through the use of AR and VR technologies, language learners can hone their abilities in virtually authentic settings, increasing the effectiveness and engagement of language learning. Additionally, they provide a number of advantages, including fostering critical thinking, raising student motivation, and offering individualized learning opportunities. There are still issues, though, like the high expense and specialized knowledge needed for VR technology and the requirement to modify AR tools according to the skill levels of students (Faramarzi & Dayag, 2023).

2.4 Machine Translation

AI-powered machine translation tools, such as Google Translate or Microsoft Bing Translator, assist language learners by providing instant translations, thus aiding in understanding and expanding vocabulary. Learners can compare translations, examine grammatical structures, and gain insights into

cultural nuances. Machine translation (MT) is a valuable tool for students to practice reading, writing, and speaking their target language, as it simplifies the process and enhances their confidence and language proficiency, which is crucial for real-world interactions, making it an effective reading comprehension tool (www.machinetranslation.com). In addition, translating text allows non-native speakers to access a vast array of language resources, including news articles, literature, online content, and social media, significantly enhancing their language learning journey (www.machinetranslation.com). For instance, MT aids language learners in comprehending complex texts like news, song lyrics, and social media posts, enhancing cultural understanding and encouraging practical language-learning methods, thus enhancing language appreciation.

Nevertheless, MT, as a developing technology, has flaws such as inaccurate translations and misinterpretation of cultural references. This can lead to incorrect learning and practice. The convenience of MT can be addictive, preventing students from developing confidence in speaking a new language. This is detrimental to language learning, as understanding and using the target language in its natural context is crucial for language improvement. Moreover, instant translations through MT can lead to students bypassing human interaction and avoiding valuable feedback, resulting in a lack of fluency and confidence in the target language, and limiting communication in limited contexts, which contradicts the goal of language learning. Although, MT can enhance language learning by providing translations in students' native languages, it can also lead to a lack of understanding of the target language and its culture, which is crucial for fluency and cultural competence. To effectively use MT, it is essential to complement the learning process rather than replace it. Guidance and support can help learners navigate challenges and make the most of this technology.

In fact, MT is a significant tool in language learning, helping individuals understand and communicate in foreign languages. While some educators may be skeptical, it can supplement traditional methods and make language acquisition more accessible. However, it should be used alongside other strategies. In the future, machine translation will become more sophisticated and integrated into classroom instruction, providing new opportunities for learners to improve their language skills efficiently and effectively. Educators

must stay updated with the latest developments in machine translation technology to effectively integrate it into their language instruction. While MT can aid in language acquisition by providing access to a wide range of content, it should be used in conjunction with traditional language learning methods and not as a replacement. The lack of actual understanding of the target language and its culture can hinder fluency and cultural competence. However, integrating MT into language instruction can help students develop practical skills, such as reading, writing, and speaking in the target language. Overall, educators should stay informed about advancements in MT technology to effectively incorporate it into language learning.

2.5 Voice Recognition Systems

Voice recognition systems, including speech-to-text software, enable learners to practice pronunciation and receive immediate feedback on their spoken language. These systems help improve learners' accuracy, fluency, and pronunciation skills.

Word recognition technology is a common feature in language education apps programmed with complex systems like neural networks and deep learning algorithms which provide learners with high-accuracy speech recognition and detailed feedback on pronunciation and speaking skills. Voice recognition technology is a valuable tool in language learning, providing instant feedback on pronunciation and improving speaking skills. It allows students to practice speaking in a low-pressure environment, gaining confidence and fluency over time (Dexway Communication, n.d.). The technology can also adapt to individual student needs, focusing on pronunciation challenges like similar-sounding words or difficulties with certain vowel or consonant sounds. This allows for faster progress in improving speaking skills. Overall, voice recognition technology offers a powerful tool for language learning (Richmond Solutions, 2023).

Voice recognition technology is not a quick solution for language learning. It should be used alongside other methods like talking, listening, and literacy skills. It may not be as accurate or appropriate for all learners, depending on factors like their native language, dialect, speaking style, and pronunciation habits.

Speech recognition technology in language learning faces several challenges, including recognizing accents and dialects, understanding context, dealing

with limited vocabulary, and providing overly simplistic feedback (ibid). These issues can hinder learners' progress and hinder their progress. Additionally, the quality of feedback can vary, and technical limitations, such as hardware and software, can affect performance. Overall, while speech recognition technology has potential benefits, it faces numerous challenges and needs to be carefully considered for its full potential (ibid).

The future of speech recognition technology in language learning is promising, with advancements in artificial intelligence and machine learning leading to more accurate systems. It is expected to integrate seamlessly with other language learning tools, such as mobile applications, online platforms, and augmented and virtual reality environments, providing a more immersive and engaging learning experience (Resources, 2023).

3. Benefits of AI in Language Teaching and Learning

AI adapts to learners' needs, abilities, and learning styles, providing personalized content and activities. This individualized approach enables learners to focus on specific language areas, thereby accelerating their progress. Moreover, AI technologies create interactive and gamified learning environments that enhance student engagement. The use of virtual simulations, adaptive quizzes, and game-based activities stimulates learners' motivation and participation. In addition, integrating MT into language instruction can help students develop practical skills, such as reading, writing, and speaking in the target language. Furthermore, AI offers automated assessment tools capable of evaluating learners' language skills objectively and efficiently. These systems analyze learners' performance in real-time, generate detailed reports, and provide targeted feedback, thereby relieving teachers from time-consuming grading tasks.

4. Challenges in Implementing AI in Language Classrooms

Integrating AI technologies in language classrooms may require substantial investments in hardware, software, and reliable internet connectivity. Ensuring equal access to AI resources for all learners can be a challenge, particularly in resource-constrained settings. In fact, effective integration of AI requires careful pedagogical planning. Teachers need to carefully select and adapt AI tools to align with language learning objectives and ensure that they enhance rather than replace human instruction. This has been emphasized by the findings of some researchers (Okagbue et al, 2023) who

concluded that school administrators ought to encourage the usage of AI and machine learning (ML) tools to provide high-quality educational services in the classroom. It is notably recommended that legislators in the field of education enact measures that will facilitate the adoption and application of AI and ML in educational settings. This is also in line with the empirical findings of Cope et al.'s study (2020) which discovered that artificial intelligence and machine learning are gradually becoming well-known phenomena in educational teaching methods. However, due to uncertainties in the use of AI and ML educational technologies, many classroom teachers, school administrators, and leaders do not completely understand their functions, dynamics, and applications (Cope et al., 2020).

At the end of this overview, it is worth mentioning that Rusmiyanto et al. (2023) have suggested in their investigation of the functions of AI in the development of communication skills in English language learners, that AI has the potential to significantly enhance English language learners' communication skills by providing personalized and interactive learning experiences. Their investigation were concluded with the following important points:

1. AI tools, like speech recognition software and virtual tutors, have shown promising results in enhancing students' oral and pronunciation abilities. When compared to learners who did not receive AI-driven feedback, learners who did demonstrated notable improvements.
2. Integrating AI into language learning environments provides pedagogical benefits by customizing instruction and enhancing learner independence. Adaptive learning platforms and AI-based chatbots offer personalized feedback, practice opportunities, and customized learning paths, leading to improved engagement and language proficiency.
3. Ethical considerations are crucial in AI-based language learning. Privacy protection measures and clear data handling policies are crucial to protect learners' personal information. In addition, eliminating algorithmic biases and guaranteeing equitable access to resources and assessments are critical to promoting equity and inclusion in AI-driven language learning contexts.
4. There are still gaps and areas that need to be researched in spite of the encouraging results. In order to investigate the long-term effects of AI on language learners' competency, longitudinal research is required. To find the

best integration plans and instructional methods that blend AI with efficient teaching techniques, more research is also needed.

5. Conclusion

The purpose of the current paper is to identify the uses of AI in language teaching and learning. This overview has found that AI is a system that is employed to comprehend natural human language. Advancements in AI technologies offer significant potential for language teaching and learning. Chatbots, virtual reality, machine translation, and voice recognition systems enhance personalized learning experiences, increase engagement, and provide effective assessment methods. However, challenges related to access, infrastructure, and pedagogical considerations need to be addressed for successful implementation. Future research should focus on exploring optimal pedagogical practices and evaluating the long-term effects of AI integration in language education.

In summary, this humble overview demonstrates how AI can help English language learners improve their communication abilities. AI technologies deliver individualized and flexible learning experiences, enabling learners to enhance their communication skills. However, ethical considerations and further investigations are required to guarantee accountable and reasonable utilization of AI in language acquisition and to optimize its potential benefits. By utilizing AI technologies efficiently and ethically, educators and policy makers can boost language learning results and enable students to acquire the communication skills they need to succeed in a globalized society.

References

- Adamopoulou, E. and Moussiades, L. (2020). Chatbots: History, Technology, and Applications. *Mach. Learn. Appl.* 2020, 2, 100006.
- Caldarini, G.; Jaf, S.; McGarry, K. (2022). A Literature Survey of Recent Advances in Chatbots. *Information* 2022, 13, 41.
- Cope, B., Kalantzis, M., Sears, D., Cope, B., Kalantzis, M., & Sears, D. (2020). Artificial Intelligence for Education : Knowledge and its Assessment in AI-enabled Learning Ecologies. *Educational Philosophy and Theory*, 1–17. <https://doi.org/10.1080/00131857.2020.1728732>, 0(0).
- Dexway Communication (n.d.). The importance of speech recognition for learning languages. A www document found at: <https://www.dexway.com/the-importance-of-speech-recognition-for-learning-languages/>. Accessed on 11/11/2023
- Okagbue Ekene Francis, Ujunwa Perpetua Ezeachikulo, Tosin Yinka Akintunde, Mustapha Bala Tsakuwa, Samuel Nchekwubemchukwu Ilokanulo, Kosiso Modest

Obiasoanya, Chidiebere Emeka Ilodibe, Cheick Amadou Tidiane Ouattara, A comprehensive overview of artificial intelligence and machine learning in education pedagogy: 21 Years (2000–2021) of research indexed in the scopus database, *Social Sciences & Humanities Open*, Volume 8, Issue 1, 2023,100655, ISSN 2590-2911, <https://doi.org/10.1016/j.ssaho.2023.100655>.

(<https://www.sciencedirect.com/science/article/pii/S2590291123002607>)

Faramarzi, Sajad & Dayag, Joseph. (2023). Augmented Reality and Virtual Reality: New Frontiers in Technology-Enhanced Language Learning. 10.4018/978-1-6684-8282-7.ch007.

Hwang, G.-J. and Chang, C.-Y. (2021). A Review of Opportunities and Challenges of Chatbots in Education. *Interact. Learn. Environ.* 2021, 1–14.

Jensen, L., & Konradson, F. (2018). A Review of the use of Virtual Reality Head-mounted Displays in Education and Training. *Education and Information Technologies*, 23(4), 1515–1529. doi:10.1007/10639-017-9676-0

Żammit, Jacqueline (2023). Exploring the effectiveness of Virtual Reality in teaching Maltese, *Computers & Education: X Reality*, Volume 3,2023, 100035,ISSN 2949-6780, <https://doi.org/10.1016/j.cexr.2023.100035>.

(<https://www.sciencedirect.com/science/article/pii/S2949678023000296>)

Chen, L. ; P. Chen and Z. Lin (2020). Artificial Intelligence in Education: A Review, in *IEEE Access*, vol. 8, pp. 75264-75278, 2020, doi: 10.1109/ACCESS.2020.2988510.

Luo, B.; Lau, R.Y.; Li, C.; Si, Y.-W. (2022). A critical review of state-of-the-art chatbot designs and applications. *Wiley Interdiscip. Rev. Data Min. Knowl. Discov.* 2022, 12, e1434.

Murf Resources (2023). How Speech Recognition is Changing Language Learning. A www document found at: <https://murf.ai/resources/speech-recognition-for-language-learning/>

Accessed on 14/11/2023

Okonkwo, C.W. and Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. *Comput. Educ. Artif. Intell.* 2021, 2, 100033.

Pérez, J.Q., Daradoumis, T. and Puig, J.M.M (2020). Rediscovering the use of chatbots in education: A systematic literature review. *Comput. Appl. Eng. Educ.* 2020, 28, 1549–1565.

Sharma, R. C. , P. Kawachi, and A Bozkurt (2019). The landscape of artificial intelligence in open, online and distance education: Promises and concerns. *Asian J. Distance Educ.*, vol. 14, no. 2, pp. 1_2, 2019.

Richmond Solutions (October 31, 2023). Speech Recognition Technology in Language Teaching (ELT). A www document found at:

<https://richmondsolution.com/en/reconocimiento-de-voz-en-el-aprendizaje-y-practica-del-idioma/>

Accessed on 12/11/2023

Rusmiyanto, Nining Huriati, Nining Fitriani, Novita Kusumaning Tyas, Agus Rofi'i, Mike Nurmalia Sari (2023) The Role Of Artificial Intelligence (AI) In Developing

English Language Learner's Communication Skills. *Journal on Education*, Volume 06, No. 01, September-Desember 2023, pp. 750- 757. E-ISSN: 2654-5497, P-ISSN: 2655-1365. Website: <http://jonedu.org/index.php/joe>

Sari, M. N. (2021). The Role of Metacognitive Strategies Training in Teaching English in Indonesian EFL Classrooms. *Jurnal Inovasi Penelitian*, 1(9), 1825-1834.

Mikropoulos, T. A. and A. Natsis, "Educational virtual environments: A ten-year review of empirical research (1999_2009)," *Comput. Edu.*, vol. 56, no. 3, pp. 769_780, Apr. 2011.

Tomedes (2023). From Classroom to Real World: How Machine Translation is Changing the Landscape of Foreign Language Learning A www document found at: <https://www.machinetranslation.com/blog/how-machine-translation-is-changing-the-landscape-of-foreign-language-learning>. Accessed on 13/11/2023

Yogesh K. Dwivedi, Nir Kshetri, Laurie Hughes, Emma Louise Slade, Anand Jeyaraj, Arpan Kumar Kar, Abdullah M. Baabdullah, Alex Koochang, Vishnupriya Raghavan, Manju Ahuja, Hanaa Albanna, Mousa Ahmad Albashrawi, Adil S. Al-Busaidi, Janarthanan Balakrishnan, Yves Barlette, Sriparna Basu, Indranil Bose, Laurence Brooks, Dimitrios Buhalis, Lemuria Carter, Soumyadeb Chowdhury, Tom Crick, Scott W. Cunningham, Gareth H. Davies, Robert M. Davison, Rahul Dé, Denis Dennehy, Yanqing Duan, Rameshwar Dubey, Rohita Dwivedi, John S. Edwards, Carlos Flavián, Robin Gauld, Varun Grover, Mei-Chih Hu, Marijn Janssen, Paul Jones, Iris Junglas, Sangeeta Khorana, Sascha Kraus, Kai R. Larsen, Paul Latreille, Sven Laumer, F. Tegwen Malik, Abbas Mardani, Marcello Mariani, Sunil Mithas, Emmanuel Mogaji, Jeretta Horn Nord, Siobhan O'Connor, Fevzi Okumus, Margherita Pagani, Neeraj Pandey, Savvas Papagiannidis, Ilias O. Pappas, Nishith Pathak, Jan Pries-Heje, Ramakrishnan Raman, Nripendra P. Rana, Sven-Volker Rehm, Samuel Ribeiro-Navarrete, Alexander Richter, Frantz Rowe, Suprateek Sarker, Bernd Carsten Stahl, Manoj Kumar Tiwari, Wil van der Aalst, Viswanath Venkatesh, Giampaolo Viglia, Michael Wade, Paul Walton, Jochen Wirtz, Ryan Wright, Opinion Paper: "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy, *International Journal of Information Management*, Volume 71, 2023, 102642, ISSN 0268-4012, <https://doi.org/10.1016/j.ijinfomgt.2023.102642>.

(<https://www.sciencedirect.com/science/article/pii/S0268401223000233>)