

HARNESSING AI-POWERED PERSONALIZED LEARNING AND ITS IMPLICATIONS ON THE TEACHING AND LEARNING OF ENGLISH LANGUAGE IN CROSS RIVER STATE

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Abstract

Traditional teaching methods in English language that are used universally though effective in many contexts are becoming insufficient for today's classrooms which are characterized by discordance in learning styles, capabilities and exposures to technology advancements. The realm of education is witnessing a transformative integration with Artificial Intelligence (AI) and central to the formative integration is the emergence of Personalized Learning. Harnessing AI- Personalized learning in English language teaching and learning present substantial benefits such as enabling learners adopt to individual user needs, providing immediate feedback. This paper explores the potentials of AI- Personalized learning in enhancing English language learning and promote active learning thereby adjusting to individual learners pace, style and proficiency level. This paper also discusses the challenges and implementation strategies including teacher capacity building, infrastructural development. Education is becoming more interwoven with digital innovations, therefore understanding AIs role in personalized learning becomes essential as this would rid of all challenges thereby making education more effective and engaging.

Keywords: Artificial Intelligence (AI), Personalized Learning, teaching and learning, English language

Introduction

English Language is central to Nigeria education because of its significant role as a medium of knowledge delivery in schools (Boluwaji, 2020). Ewah, (2016) asserts that the lecture method which centers on direct information dissemination is the principal teaching method used by secondary school teachers in Nigeria. Ayodelde, (2023) opine that the traditional teaching method appeared to be less interactive, students are more or less passive learners while teachers see themselves “as know it all” and the students get distracted easily. He also stated that the traditional teaching method does not provide the students with a personalized learning experience. Unfortunately traditional teaching methods that are used in Nigerian schools are becoming insufficient for today's classrooms therefore need tools that has the ability to adapt to individual needs and learning styles of students Artificial Intelligence (AI) is rapidly transforming a vast variety of sectors especially in education. AI in our present society has emerged as a driving force for personalizing education that would bring about a paradigm shift from the traditional teaching method.

AI is a branch of computer science that focuses on the development of intelligent machine capable of learning and problem solving which has a huge influence on education. AI facilitates real time data analysis, enabling teachers to gain insight into student engagement, comprehension and areas of struggle. AI does not only enhance the learning experience but also provide valuable feedback to educators aiding in the refinement of teaching strategies (Kabidi, Pappas & Olsen, 2021, Zhai, et al., 2021). AI technology can ease the burden on teachers in handling repetitive administrative tasks, such as preparing lesson plans, assessing exam, checking studies, home-work and others.

Personalized learning, an aspect of AI in education is a pedagogical approach that tailor educational experiences to accommodate individual learners' unique needs, learning styles and pace (Pane, et al., 2017). This approach recognizes and accommodates diverse learning styles, aptitudes and preferences fostering a more inclusive and effective educational environment. Examples of personalized learning are AI-powered chat bots and virtual assistants, AI-powered personalized learning platforms utilize adaptive algorithms to deliver content that align with the proficiency level of individual students (Odeleye & Adeigbe, 2018). These AI algorithms also analyze vast amounts of data, including students' progress, performance and preference. This would help students not to feel overwhelmed by materials that are too advanced for them but neither challenge those who require more accelerated learning experiences. For example interactive stimulation and virtual reality captures students' attention and enhances engagements thereby providing immersive learning experiences making complex concepts more accessible and appealing to diverse learning AI tools are appropriately suited to address the challenges in English language teaching and learning. For example, they can provide immediate feedback, track learner progress. Tools such as Duolingo and Babble, leveraging these technologies teachers can enrich the learning environment, improve accessibility, and offer targeted practice in key language skills such as listening speaking, reading and writing. Equally AI-Powered tools like Grammarly (Fitrial, 2021), and Write Lab (Hewett, 2015) have made communication much more manageable by facilitating real time grammar corrections, stylist suggestions and vocabulary corrections (Akylidiz, 2024). The more interesting uses of AI platforms like Duolingo and Linguist go beyond language learning into personalizing learning experiences.

AI-Powered personalized learning has the potential to revolutionize the teaching and learning of English language by providing tailored learning experiences that cater to individual learners, needs, abilities and learning styles. Benefits of AI-powered personalized learning in the teaching and learning of English language are numerous and include: improve language proficiency. AI powered personalized learning can help learners improve their language skills more effectively (Knewton, 2018). AI powered personalized learning equally enhances increase in learners engagement and motivation (Pane, et al., 2014)

Examples of AI-Powered tools for English language learning include: AIESL, is a customized ESL learning aid that provides personalized learning plans, interactive language exercises and real-time feedback. Another is Tutor which is an AI-Powered tool that offers personalized assistance in grammar, vocabulary, writing, reading comprehension, and literacy analysis. It provides interactive lessons, feedback, and encouragement. Despite the numerous benefits accrued AI-Powered personalized learning into the teaching and learning of English language, it is challenged with the digital divide where AI-Powered Personalized learning tools are not accessible to students from diverse socioeconomic backgrounds. Data privacy concerns ensuring students data protection to prevent misuse or breaches. Another challenge to harnessing AI-Powered personalized learning is that majority of Nigerian teachers are unfamiliar with AI-technologies thereby making its implementation a vague reality.

The contribution to personalized learning provided by this study has a significant implication for the field of education. Traditional evaluation method often fail to deliver consistent and scalable assessments. They require significant labour, suffer from inconsistencies, and are prone to human error (Nicol & Macfarlane-Dick 2006, Hill & Mille 2013, Sadler, 1989) it is against this back

ground that this paper examines AI-Powered personalized learning in the teaching and learning of English Language.

By analyzing the use of AI in personalized learning this paper seeks to provide insights into how AI-Powered personalized learning can be leveraged to enhance students engagement, improve learning outcomes, and cater to individual learning styles and preferences.

CLARIFICATION OF CONCEPTS

❖ **The Concept of AI**

AI coined in 1950's encompasses an evolving and wide range of technologies that aim to stimulate human intelligence, including machine learning and deep learning. Artificial intelligence (AI) refers to the simulation of human intelligence in machines, enabling them to perform tasks such as problem-solving, learning and decision-making (Russell & Norrigh, 2021). Ekeamadi, (2023) opined that Artificial Intelligence (AI) is a multi-faceted discipline within computer science aiming to create systems capable of performing tasks that typically require human intelligence. Barabas, S., Cukorova, M., & Shawe-Taylor, J. (2018) describes Artificial intelligence as the capacity of a digital computer or computer-controlled robot to carry out tasks that are frequently associated with intelligent individuals.

Artificial Intelligence (AI) is believed to be able to help human beings learn better and achieve educational goals more effectively. That is why it is not a surprise that in our present day many AI based innovations and breakthroughs have been used and would be applied to support the teaching and learning process to make it more practical and effective. AI in the present education sector poses a challenge that must be faced so that the existence of education would last. There are many misgivings that teachers cannot be replaced by AI are teacher collaboration with AI in the implementation of learning. Teachers need to have skills in utilizing science and technology (Science and Technology). So that teachers can take advantages of AI in terms of completing schools administration such as making lesson plans students' attendance list, reporting student outcomes, making learning media and learning resources.

Based on the definition of AI, it was created to be able to imitate humans in the form of programs and robots that is to facilitate human work. AI is used to make things easier for humans, several technology companies have implemented AI including Amazon, Facebook, Microsoft and Google.

❖ **AI Powered Personalized Learning**

AI-powered Personalized Learning involves tailoring educational experiences to meet the individual needs, preferences, and learning pace of each student. The concept of AI -powered Personalized Learning involves leveraging machine learning algorithms to create adaptive learning paths and tailor content delivery to individual learner needs (Nazareth, sky et al., 2022; Odeleye & Adeigbe, 2018).

Personalized Learning bears some resemblance to other examples of AI technology. Personalized Learning allows each student to progress and develop according to the speed and ability of each student in mastering the material and learning according to their desires and abilities (Mufdalifah, 2017). Personalized Learning allows users to get services like personal assistant by improving the quality and learning patterns to be more practical and effective. This has been proven by various studies and applications by various Edutech platforms, which after using AI technology can have a significant impact on improving the quality and effectiveness of learning. Harnessing AI-powered Personalized Learning has several benefits; it leads to improved students engagement by providing content that is relevant and interesting to each student thereby increasing their motivation and involvement in the learning process (John, et al ., 2018 ; Olushola & Olabode, 2018). Through AI-powered Personalized Learning, students learning styles and paces can be supported by providing customized learning experiences that accommodate different preferences and abilities, thereby promoting inclusivity and equity in education (Nazareth, sky et al., 2022)

❖ **The Teaching and learning of English Language in the AI-Powered era**

Artificial Intelligence has greatly been recognized as a powerful tool in harnessing English Language teaching and learning, offering innovative methods. Zou, et al., 2023 asserts that recent scholarship emphasizes the integration of intelligent tutoring systems, natural language processing (NLP) and automated writing evaluation to enhance language acquisition. AI tools enhance personalized learning experience by tailoring content to learners' proficiency levels, thereby improving engagement and motivation (Chiu, 2022). For example, Chatbots encourage learners to practice conversational English in real-time, providing authentic communicative opportunities outside traditional classrooms (Wu & Yan, 2023). AI leverages AI tools to create personalized interactive and immersive learning experiences, improving skills such as writing, grammar, pronunciation, and fluency through interest feedback and adaptive content. The use of AI-harnessed tools and machines have paved ways for new innovations that has reshaped lesson delivery (Tim, et al., 2024). Hence many English language experts and educators are turning to the use of software (Online and Offline) and AI-tools in pedagogy and research.

❖ **AI-Powered Personalized Learning tools for the teaching and learning of English Language.**

AI-powered personalized learning platforms use AI algorithms to tailor content to individual learner needs, providing adaptive and personalized learning experiences. There are many AI-powered tools used in the teaching and learning of English language (Omachonu & Orukpe, 2023; Farrow, 2024) however, as we harness AI-tools in education, it is imperative to recognize that they are designed just to supplement not replace the learning experience. Below are some of the AI powered tools used in worldwide for the teaching of English language summarized from (Omachonu & Orukpe, 2023, Farrow, 2024, Timayi Etal., 2025)

- ❖ **Duolingo:** This is a popular language app that uses AI to provide personalized language experiences by adapting lessons making learning fun and personalized (Duolingo, 2022)
- ❖ **Babbel:** Focus on the conversational skills with AI-driven speech recognition.
- ❖ **Rosette stone:** This all important tool offers immersive environments with AI feedback on pronunciation.
- ❖ **Grammarly:** An AI-Powered tool that provides personalized feedback on grammar, syntax and vocabulary (Grammarly, 2022).
- ❖ **Quillt:** This is a versatile AI writing tool designed to enhance students writing skills and improve their overall fluency. It offers features such as paraphrasing, grammar checking, and summarization.
- ❖ **LingQ:** This is an innovative AI tool designed to support language learning through immersive reading and listening experiences
- ❖ **Get Pronounce for Students:** This is an AI tool designed to help learners perfect their pronunciation. It provides instant feedback on spoken English, thereby making it a valuable resource for improving accuracy, accent and clarity.
- ❖ **Microsoft Reading Coach:** This is a powerful AI tool designed to enhance language learning for students of all ages. Being an interactive platform, it offers personalized reading support, thus allowing learners to practice their skills at their own pace.
- ❖ **Word wall for Teachers:** This AI tool allows teachers to create interactive and engaging activities for language learners. E.g to create a quick quiz, a matching game or a word search.
- ❖ **Cograder:** This tool focuses on streamlining the grading of essays, test, and assignment, offering a fast and affordable solution for educators.
- ❖ **Grade scope:** This uses machine learning to grade various assignments, including essays and coding, providing instant feedback.
- ❖ **Teacher Made:** This AI tool is user friendly and was designed to support teachers with lesson planning. It allows teachers to easily create interactive customizable assignments and assessments.

- ❖ **ChatGPT for teachers:** This AI tool is versatile in nature, it can assist language teachers in several ways; capable of generating lesson plans, creating engaging learning materials, creating rubrics, stimulating conversation partners.

Benefits of AI-Powered learning in the teaching and learning of English Language

- ◆ **Increased engagement:** English language learning can become more engaging and effective through AI-Powered platforms such as gamification. These AI-Powered interactive and gamified learning environments increase students engagement in the teaching and learning of English language usage. This is because these environments incorporate elements of play and interactivity, thereby transforming the traditional learning into a more dynamic experience.
- ◆ **Improved assessment:** Language skills such as grammar, vocabulary, and pronunciation can provide instant and objective feedback through AI thereby freeing teachers to focus on instructional strategies.
- ◆ **Facilitate inclusive education:** AI-Powered tools facilitate inclusive education by providing speech to text, translation, and pronunciation support for learners with diverse needs (Zhang & Aslan, 2024). AI-Powered tools were also found to lower barriers for learners with disabilities by providing alternative modes of engagement (Holmes, 2022).
- ◆ **Learner autonomy:** AI-Powered platforms foster a more learner-centered classroom which shows an increase in learner motivation, and reduces anxiety (Wu & Yan, 2023). Automated feedback tools, such as AI-based writing evaluation systems, allowing learners to receive instant correction grammar, vocabulary, and structure promoting autonomy and continuous self-improvement (Kessler, 2023).
- ◆ **Pedagogical Innovation and Teacher Support:** Administrative burdens encountered by teachers could be lessened by the use of AI-Powered tools. Almarza, et al., 2024 asserts that automated assessment systems save time on grading and allow teachers to focus on higher-order pedagogical tasks such as designing interactive activities and mentoring learners. Importantly, AI Powered tools are not seen as a replacement for teachers but as a supportive tool that enhances their effectiveness. Several studies also highlighted the potential of AI-Powered Chatbots and conversation capable of providing 24/7 learner support and extending practice opportunities beyond the classroom (Zou, et al., 2023).

Challenges of harnessing AI-Powered personalized learning

Despite the huge benefits that are accrued in personalized learning in the teaching and learning of English language, it also has significant challenges. Access to AI remains uneven, especially in context where digital infrastructure is weak or unreliable (Owolabi & Ogunlade, 2023).

- **Digital Divide**
The digital divide poses significant challenges in ensuring accessibility for all students because students in poorer or rural communities often lack devices or stable connectivity. Eze, et al (2020) asserts that a significant number of students lack access to AI-Powered learning tools due to socio-economic disparities. Through AI has the potential to enhance learning experiences, it is however essential to consider how to make AI-Powered personalized learning tools accessible to students from diverse socio-economic backgrounds (Marino, et al., 2023).
- **Teacher Preparedness**
Many teachers lack digital literacy; there is also the fear of being replaced by AI tools. Majority of Nigerian teachers are unfamiliar with AI-technologies, making its implementation difficult (Zawacki-Richter et al, 2019).
- **Ethical Concerns**
Ethical concerns such as data privacy, algorithmic bias and over reliance on technology were recurrent issues raised by scholars (Holmes, et al., 2022). Data privacy concerns arise from the need to balance personalized learning with data protection and address ethical considerations in AI-Powered education (Murdech, 2021). Bias in Algorithms, AI models may inadvertently reinforce existing biases; affecting educational fairness (Bender, et al.,

2021).

● **Infrastructure Gaps**

Infrastructural gaps include frequent power outages; spotty or expensive internet, lack of devices in resource-constrained contexts, such as in many developing countries, infrastructure required for AI developing countries, infrastructure required for AI deployment including stable internet connectivity, reliable power supply and teacher training remains limited (AI-Said, 2023).

Conclusion

The contribution of AI-Powered personalized learning provided by this study has significant implications for the field of education. AI-Powered systems can automate the evaluation and provide honest time feedback with built in provisions for the need of individual learners ensuring that no learner is missing out (Muthmaimah et al., 2024). However the paper also highlights significant challenges, particularly in relation to the use of data, equity in access, and the evolving role of teachers (Holmes, et al., 2022; AI-Said, 2023). This paper opined that it is imperative that efforts are made to improve AI-Powered infrastructure and ensure its availability and accessibility to all schools, bridging the digital divide and creating equal opportunities for students across CRS. Harnessing AI is not just a choice but a necessity if teachers in Cross river State are to unlock the full potential of language education.

The Way Forward

Ensure process in the teaching and learning of English language. The following suggestions could help schools in Cross River State by exploring the innovative resources and considering how they can be integrated into classroom practices to simplify tasks and ultimately improve students' outcomes.

- ❖ **Teacher Training and Capacity Building:** Professional development programs must equip teachers with the skills to integrate AI effectively into English language classroom, ensuring they remain central to the teaching and learning process. Also include AI and digital literacy on teacher education curricula.
- ❖ **Ethical Design and Governance:** In order to prevent bias and protect students' rights, developers and policy makers should prioritize transparency, fairness and learner data privacy (Holmes, et al., 2022).
- ❖ **Pedagogical Integration:** However, as we harness AI tools in education; it is imperative to recognize that AI should be applied as a supportive tool, complementing communicative and humanistic teaching approaches rather than replacing teacher-led interaction (Zhang & Aslan, 2024).
- ❖ **Policy and Infrastructure Development:** National education policy should explicitly include AI education and ensure data privacy laws protect learner data. Governments and institution should access to AI tools, particularly in regions where technological gaps risk exacerbating educational inequality (AI-Said, 2023)
- ❖ **Collaboration & Partnership:** There should be a strong collaboration between government, NGO, Private sectors, tech companies to provide adequate digital tools such as computers, internet facilities, mobile phones, projectors, tape-recorders, photocopies, laptops and the language laboratories in order to facilitate the use of AI in teaching and learning process.

References

- Akyildiz, S. T (2024). Enhancing or hindering? AI's role in sparking creativity in language teaching: Insights from private high school EFL teachers; *International e- Journal of Educational Studies (IEJES)*. Vol. 8(2), 14-27
- Al- Said, K.(2023). Artificial intelligence in education: Opportunities and challenges in developing countries. *International Journal of Educational Technology in Higher Education*, 20(1), 1-14.
- Almarza, G., Ortega, J., & Perez, R. (2024). Teachers' perceptions of artificial intelligence in English language teaching: Benefits and concerns. . *Language learning & Technology*. 28(1). 45-63.
- Ayodele, A.F. (2023). Impact of Google classroom instruction on students learning outcomes in English grammar in Ekiti State. Unpublished M.Ed. Dissertation, Ekiti State University, Ado-Ekiti.
- Barabas, S., Cukurova, M., & Shawe-Taylor, J. (2018). Artificial intelligence alone will not democratize education: *Sustainability*, 16(2), 781.
- Chui, T.K. F. (2022). Artificial intelligence in language education: A systematic review and its implications. *Computers and Education*, 179, 104405. <https://doi.org/10.1016/j.compedu.2021.104405>
- Ekeamadi, O. A.(2025). Harnessing Artificial intelligence (AI) and Machine Learning (ML) Technology for Transformative Social Studies Education in Nigeria. *International Journal of Education, Society and Governance*.
- Ewah, P.N.(2016). Effects of Cooperative learning Strategy on senior secondary school students achievement in Bio in Afikpo Educational zone. Unpublished ME.d Dissertation. Ebonyi State University Abakaliki.
- Eze, T. I., Nwankwo, C. A., & Okonkwo, R. U. (2021). ICT integration and Counselling practice in nigeria Tertiary Institutions. *Nigeria Journal of Education Studies*, 27 (1), 101-115.
- Fadele, K. P., Afolabi, A. A., & Odetola, F. O. (2024). Mental health challenges in Nigeria: Bridging the gap through innovative approaches. *BMC psychiatry*, 24(1), 1-12. <https://doi.org/10.1186/s12888-024>
- Farrow, L. (2024). Best AI tools for English teachers. Retrieved from <https://congrader.com/content/best-ai-tools-for-english-teachers/> Akkiliz, S. T. (2024). Enhancing or hindering? AI's role in fostering creativity in language teaching: Insights from private high school English as a Foreign Language teachers. *International e- Journal of Educational Studies (IEJES)*, Vol. 8.
- Fitria, T. N. (2021). Grammarly as an AI-powered English writing assistant: Students' alternative for writing English. *Journal of English Language, Literature, and Teaching*, Vol. 5, No. 3, pp. 65–78.
- Hill, J. D., & Miller, K. B. (2013). *Classroom instruction that works with English language*

learners. *ASCD, Vol. 10(3).*

Holmes, W., Porayska-Pomsta, K., & Holstein, K. (2022). Ethics of artificial intelligence in education: Challenges and pathways forward. *British Journal of Educational Technology*; 53(3), 423- 439.

Kessler, G.(2023) . Artificial intelligence in English language education: From automated feedback to adaptive assessment. *TESOL Quarterly*; 57(1), 8- 29.

Mario, M., Vasquez, E., Dicker, L., Basham. J., Blckorby, J. (2023). The future of artificial intelligence in Special education. *Technology. Journal of Special Education. Technology*, 38(3), 404- 416.

Munther, A. M. B. (2021). Privacy and artificial intelligence challenges for digital health information in a new era. *BMC Medical Ethics*, 22(5). <http://doi.org/10.1186/s12910-021>

Murdoch,B(2021). Privacy and artificial intelligence challenges for protecting health information in a new era BM *Medical Ethics* , 22(1). <https://doi.org/10.1186/3/2910-021>

Muthmainnah, M., Cardoso, L., Alshhagh, Y.A. M . R., Al Yakin, A. and Apriam , E.(2024).. Check for updates advancing sustainable learning by boosting student self – regulated learning and feedback through AI-driven personalized. *EFL* 8(1).36- 46

National Information Technology Development Agency (NITDA). (2019). Nigeria Data Protection Regulation (NDPR) Implementation Framework. Abuja: NITDA. Retrieved from <https://nitda.gov.ng>

Nazaretsky, T., Bar, C., Walter, M & Alexandron , G.(2022). Empowering teachers with AI : Co- designing a learning analytics tool for personalized instruction. *The Science classroom*.7(1),34- 45.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, Vol. 31(4), pp. 199–218.

Nwokediegwu, Z. Q. S., Ugwuanyi, E.D., Dada, M. A., Majemite, M. T., & Obaigbena, A. (2024). AI-driven waste management systems: a comparative review of innovations in the USA and Africa. *Engineering Science & Technology Journal*, 5(2), 507-516.

Obaigbena, A., Lottu, O. A., Ugwuanyi, E. D., Jacks, B. S., Sodiya, E. O., & Daraojimba, O D. (2024). AI and human-robot interaction: A review of recent advances and challenges. *GSC Advanced Research and Reviews*, 18(2), 321-330.

Odeleye, D. A and Adeigbe, Y.K.(2018). Girl -Child Education and Women Empowerment for Sustainable Development: A book of Readings; in Honour of Dr Mrs Oyebola Ayeni . College Press & publishers, Lead City University.

Olushola, A. O., & Olabode, K. T. (2018). Prevalence of sexting among students in selected secondary schools in southwestern Nigeria. *Gender and Behaviour*, 16(1), pp. 1101–11025.

- Omachonu, C. G., & Orukpe, A. A. (2023). Shaping the future: Artificial intelligence and the English language pedagogy. *International Journal of Arts, Communication and Pedagogy (IJACOP)*, 2(2), 1-4.
- Owolabi, T., & Ogunlade, O.(2023). Barriers to AI Adoption in language education in Sub-Saharan Africa. *International Journal of Educational Technology in Higher Education*, 20(1), 67- 82.**
- Russell, H. & Norvig, S. (2010). The digital frontier: AI –enable transformation in higher education management. *Indonesian Journal of Educational Research and Technology*, 4(1) 71-88**
- Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, Vol. 18, pp. 119–144.
- Golonka, E., Bowles, A., & Reeder, J. (2023). Adaptive AI systems in foreign language education: Evidence of learning gains. *ReCALL*, 35(2), 123-139. <https://doi.org/10.1017/S0958344023000061>
- Timay, J. M., Chomo, H. J., Gwandum, S. G., Ayuba, I., & Sambo, P. T. (2024). Integrating technology-enabled learning methods, artificial intelligence and machine learning models into Nigerian colleges of education for quality mathematics education. *Proceedings of 60th annual National conference of Mathematical Association of Nigeria (MAN)* Pp 288-294.**
- Timaya, J., Chomo, H. J., Gwandum, S. G., Ayuba, I., & Sambo, P. T. (2024). Integrating technology-enabled learning methods, artificial intelligence and machine learning models into Nigerian colleges of education for quality mathematics education. *Proceedings of 60th Annual National Conference of Mathematical Association of Nigeria (MAN)* pp 288-294.
- Vaidyam, A. N., Wisniewski, H., Halamka, J. D., Kashavan, M. S., & Torous, J. B. (2019). Chatbots and conversational agents mental health: A review of the psychiatric landscape. *Canadian Journal of Psychiatry*, 64(7), 456-464. <https://doi.org/10.1177/0706719828977>
- Wu, X., & Yan, J. (2023). AI chatbots for English language learning: Opportunities and challenges. *Journal of Educational Computing Research*, 61(7), 1714-1732
- Yanwen,(2025). Transforming English language education with AI driven deep learning model for scalable adaptive and inclusive assessment. *International Journal of information and communication Technology*. Vol26, No. 12**
- Zawacki-Richter, O., Marin .V.I .Bond. M., Gouverneur, F.(2019).. Systematic review of research on artificial intelligence application in higher education. *International Journal of Educational Technology in Higher Education*.16 (1), 39- 53.**
- Zhang, Y., & Aslan, A. (2024). Inclusive education through AI: Supporting English learners with special needs. *Educational Technology Research and Development*, 72(3), 411-429.
- Zou, B., Huang, L., & Wang, J. (2023). Artificial intelligence and English language education: A review of trends and future directions *Systems*, 155, 102880. <https://doi.org/10.1016/j.system.2023.102880>.