
Artificial Intelligence in English Language Learning: A Systematic Review of Personalization and Learner Engagement

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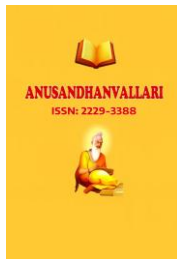
Abstract: Artificial Intelligence (AI) is revolutionizing the way English learning is approached, providing the opportunity to create personalized learning experiences that adapt and respond to each student's unique needs and emotions. This systematic review reviews the findings of recent empirical and theoretical research to examine the effect of AI-based technologies such as Intelligent Tutoring Systems (ITS), interactive chatbots, and generative AI models such as ChatGPT on personalization and learner engagement. Results show that AI promotes tailored learning and instructional approaches through adaptive learning algorithms and comprehensive student models, which adapt instruction and feedback to the cognitive and linguistic needs of each student. In terms of learner engagement, AI tools have been demonstrated to have a substantial impact on motivation, self-efficacy, and the decrease of Foreign Language Learning Anxiety (FLLA), as they offer a safe, low-risk learning environment. Despite such advantages, the review highlights key obstacles such as the lack of a cohesive, theoretical framework for designing AI applications, improving teacher AI literacy, and addressing ethical issues like data privacy and language bias. The review concludes by recommending a mixed-methods pedagogy that blends the precision of the machines and the socio-emotional support of humans, and advocates for the need for follow-up studies to evaluate the long-term impact of AI on language retention and its translation to real-world language ability.

Keywords: Artificial Intelligence in Language Learning, Personalized Learning, Learner Engagement, Intelligent Computer-Assisted Language Learning (ICALL), Generative AI, Foreign Language Learning Anxiety (FLLA), Adaptive Learning, Educational Technology.

Introduction

The incorporation of Artificial Intelligence (AI) in language learning is a new paradigm in the field of education, shifting the boundaries of the classroom into a multi-faceted and technologically powered learning environment. Language learning in today's globalized world is more and more influenced by the intelligent technologies that react to learner behavior, emotional processes and sociocultural processes. With the advent of AI tools, such as chatbots, Intelligent Tutoring Systems (ITS), speech recognition, and generative models like ChatGPT, the landscape of English learning, teaching, and evaluation has undergone a profound shift. The introduction of AI technologies, including chatbots, Intelligent Tutoring Systems (ITS), speech recognition, and generative models like ChatGPT, has significantly altered the way English is taught, learned, and assessed.

Personalization of language learning is one of the most important benefits of AI. AI systems can deliver personalised experiences to individual students through adaptive learning algorithms, which can help meet the unique preferences, cognitive needs and learning speeds of individual students. Such systems can deliver immediate feedback, monitor progress, and mimic real communication contexts, enabling learners to communicate with pedagogical agents in a human-like manner. Moreover, AI is important in managing the learner's psychology, and that is where the literature shines its light on the ability of AI to enhance motivation and self-efficacy, while minimizing Foreign Language Learning Anxiety (FLLA) by creating low-risk contexts for practicing foreign language skills and allowing for errors to be made without human evaluation.



This potential is not realized, however, because of some significant limitations. Both, the theory of AI and the applications are not well founded and have not been well connected to the established Second Language Acquisition (SLA) principles. Although AI can provide this computational precision, the educational efficacy relies on careful instructional design. Not to mention, the emotional effect of AI is multifaceted – it can help reduce anxiety, but it can also cause technostress, cognitive overload, or dependency on the learner if not designed to be user-friendly.

There is also a significant gap between technology and teacher preparedness. Formal AI literacy is lacking by many teachers and causing resistance or underutilization of these tools. Moreover, many AI tools are designed for specific languages, such as English, which can lead to a lack of awareness of linguistic variations and nuances, such as idiomatic expressions, or neglecting cultural differences. Lastly, there is still a lack of empirical studies on the long-term consequences of AI, such as retention and practical usage. The current study synthesises existing literature to examine the integration of AI in an ethically and pedagogically sound way to promote equitable, learner-centred English education.

CALL to Intelligent Computer-Assisted Language Learning (ICALL)

The trend of Computer-Assisted Language Learning (CALL) research and development can be understood in stages which move from the behavioral to the communicative and to the integrative stages since the 60's. Originally, CALL was based on basic stimulus-response drills, but with the development of digital technology, websites and internet resources, multimedia materials, and machine learning have become a part of it. Intelligent CALL (ICALL) is the next evolution of this, which utilizes artificial intelligence to overcome 'one size fits all' approaches to instruction.

In contrast to conventional CALL, ICALL systems offer complex interaction between the learner and the environment with the help of two technologies: Natural Language Processing (NLP) and Expert systems. These are interactions which enable a dialogue between human and machine, so that students can communicate in English in authentic ways. ICALL makes learning more effective for various backgrounds by offering personalized learning, intelligent tutoring and automated feedback. The challenge for traditional CALL was to provide instruction at multiple levels without making trade-offs, but AI holds promise for adaptive and flexible learning, dynamically responding to the needs of each student.

Foundational AI Technologies: NLP and Machine Learning

Natural Language Processing (NLP) and Machine Learning (ML) form the core of contemporary AI-supported language education. NLP (Natural Language Processing) and ML (Machine Learning) are the backbone of modern AI-supported language education. NLP enables computer systems to mimic human intelligence through understanding and creation of natural language. It supports learning processes by analyzing the aspects of text, and helps to choose the right text and to create the activity, including the automated question, which can be of quality equal to the humanly designed question.

Machine Learning, such as deep learning and neural networks, can analyze large amounts of data and identify patterns in learner input. The technologies that underlie Automated Writing Evaluation (AWE) and Computerized Dynamic Assessment (CDA). In the real world, ML tools, such as Grammarly, enable students to learn the skills in an automated way, enabling them to understand and analyze the linguistic aspects that they were not previously aware of. The effectiveness of these technologies is dependent on the data that are incorporated into its program when it was designed.

The Mechanism of Personalization: Adaptive Learning Algorithms

AI enables personalization by using Adaptive Learning Algorithms to create comprehensive profiles of individual students, including their knowledge, desired outcomes, and preferences. Those algorithms monitor

learning activities and give personalized suggestions and supports. This is one such program called “Soljam”, which is based on the diagnostic test to understand the level of the student and his/her shortcomings and then, prepare a customised lesson plan that will keep changing as the student advances.

These systems enable content and the level of difficulty to be customized to the learner, ensuring that instruction is at the ZPD, or Zone of Proximal Development, where learning is most conducive. This is a way to surmount the "static" nature of traditional classrooms in which a single interface and information are shared among all students. Personalised pathways enable students to learn at their own speed and in their own way to achieve good learning outcomes.

4. Generative AI/ Large Language Models (LLMs)

With the advent of Generative AI, specifically LLMs such as ChatGPT, human-like conversational functionality has been added to English learning. ChatGPT has been trained on a large amount of data, such as books and web pages, which is why it is able to comprehend natural language patterns. It can simulate human speech so well that it serves as a "fun and modern" tool in L2 teaching and learning, by providing L2 word meanings in context and genre-specific writing support.

LLMs also support Personalized Cloze Test Generation, streamlining the process of creating tests by producing question stems and distractors from a single input word depending on each user's proficiency level. Educators are concerned that responses produced by LLM may not be accurate or coherent, yet they are very informative. While the limitations mentioned above are important to consider, the use of LLMs as "study partners" or "guides on the side" instead of as a substitute for face-to-face interaction is still seen as a valuable way to encourage critical thinking and problem-solving skills.

Student Model Concept and Intelligent Tutoring Systems (ITS)

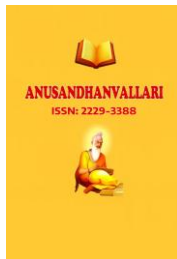
Intelligent Tutoring Systems (ITS) are created to offer individualized training, but without constant human educator intervention. Typically, an ITS has three parts: a Domain Model (the structure of the knowledge of the language), a Student Model (the structure of the student's knowledge of the language), and an Instruction Model (the pedagogical component that determines what to teach next).

ITS can give feedback on pronunciation, vocabulary, or grammar as needed and can be used to achieve higher effect sizes in reading comprehension than traditional instruction. E-Tutor and TAGARELA are systems that offer individual performance-specific feedback messages via an adaptive learner model. Although it is impossible to replace a human teacher because language is so complicated, an ITS that takes care of 10-15% of the routine steps in a class still offers significant savings in human resources.

Scaling up and embedding Learning Platforms for enhanced Learner Engagement using Interactive Chatbots

AI chatbots, defined as virtual interactive agents, have become popular due to their ability to provide unlimited patience and instant responses. They reduce learner anxiety because of the sense of privacy, which gives students the opportunity to practice some areas of language that they may not feel prepared to use with a human. Research indicates that chatbots can stimulate natural language conversations and offer personalized feedback, which boosts students' motivation and engagement.

Furthermore, chatbots can create real-world scenarios for learning, like ordering food or role-playing situations, making learning fun and applicable to real life. Chatbots can shape student engagement through gamification techniques, such as points, badges, and leaderboards, instilling a sense of competition and motivation. The gamification of learning through points, badges, and leaderboards can have a constructive effect on student engagement. But the effectiveness of the intervention may be affected by the user interface and the student's digital literacy level; if the technology is not easy to use, frustration may occur.



Psychological Outcomes: Motivation, Grit and Anxiety Regulation

The use of AI in English education has a significant effect on psychological factors such as motivation, perseverance, and anxiety. The study conducted with ChatGPT has proven that academic demotivation and Foreign Language Learning Anxiety (FLLA) have been reduced among Saudi Arabian EFL learners. AI creates a safe space for students to practice their communication skills, which helps them feel confident in their abilities.

Moreover, AI tools that integrate design thinking competencies can contribute to the development of a learner's "L2 grit," or their ability to persevere when facing language obstacles. With the integration of AI systems that respect Self-Determination Theory (SDT), which satisfy the need to be competent and autonomous, it becomes possible to increase intrinsic motivation. But, the emotional release is not guaranteed: if students are not used to the technology or don't feel as supported as they would be with a real teacher, they can suffer technostress.

Core Language Skills: Reading and Listening - effect on

Technology that uses AI for reading focuses on personalized comprehension, context-rich vocabulary, and real-world texts. Read Theory adjusts the text difficulty level dynamically according to student answers, whereas Tutor AI enables students to ask for the simplification of challenging texts. LLMs are also employed to create personalized reading content for middle-school students that on some occasions exceeds that of human writing.

AI can help with pronunciation, accent exposure, and instant understanding when you are listening. Automatic Speech Recognition (ASR) is a technology much used in Intelligent Personal Assistants (IPA) such as Alexa, Google Assistant, etc. Some studies indicated that the speed of speech was the reason why some lower-proficiency students found no immediate improvement in listening comprehension after the introduction of the IPAs; however, it was found that IPAs were very effective in pronunciation practice and reducing social anxiety in oral tasks. Word recognition is further enhanced by multimodal integration (combining audio, visual and text).

Effect on these key language skills: Writing and Speaking

Automated Writing Evaluation (AWE) software, such as Grammarly, offers instant feedback on grammar, spelling, and mechanics, fostering learner autonomy and editing. Paraphrasing and lexical variation can be aided with the help of tools like QuillBot and ChatGPT, which enable students to convey ideas in various ways. AI writing coaches detect logical fallacies in argumentative writing and give feedback customized to the student, a task that a human teacher might never have time to do.

AI technologies enhance connected speech perception and intelligibility in speaking. With the use of AI voice recognition systems, students can repeat their input as many times as they want without fear of making errors, resulting in substantial increases in fluency and accuracy. Interactive conversational agents enable students to practise spontaneous speech and respond spontaneously to cues in context. These tools can be used in flipping classrooms, which is very effective for enhancing students' ability to speak.

Theoretical Frameworks: Activity Theory and SDT

In recent studies, Activity Theory (AT) is utilized to explore how activities are shaped by sociocultural contexts and how these shape the learning process with the help of the AI. AT is the study of the relationship between the Student (Subject), Task (Object), Tools (AI), Rules (Course Design), Community, and Division of Labor. It emphasizes the role of learning outcomes not solely as a result of the technology itself but as a result of the collaborative work of the teachers, peers and the AI environment.

Another foundation is Self-Determination Theory (SDT), which examines the role of AI in promoting autonomy and competence. Another foundation is Self-Determination Theory (SDT), which looks at how AI can support

autonomy and competence. The use of AI systems places the learner at the centre, enabling them to make their own learning plans, a concept that aligns with constructivist principles of personalized learning and learning that is accessible to all. Theoretical synergies provide a full spectrum of understanding for how learners interact with AI, aligning technology with educational objectives and not merely its technical capabilities.

Challenges: Digital Inequality, Bias, and Teacher Readiness

There are considerable challenges to the universality of the success of AI in English learning. One of the major issues is digital disparity, as many AI platforms require high-speed internet access and sophisticated devices that are not always available in marginalized and rural regions. In addition, there is a linguistic bias in the system, with most AI research and training data focused on English, and insufficient information for non-fluent speakers of less commonly taught and under-resourced languages.

The other big challenge is teacher readiness; many teachers are feeling threatened by the “replacement” narrative, and/or don't have enough AI literacy to effectively use the tools. Certain teachers might find it difficult to handle the output of AI or ensure student privacy without proper training. Further, AI models are still a long way from understanding cultural nuances, humor, and idiomatic tasks, key elements for communicative competence.

Affective Computing and Hybrid Pedagogy: Future Directions.

The future of English learning is in Affective Computing, which is one of the approaches that involves embedding emotion recognition into AI systems for more empathetic and supportive interactions. Soon, AI assistants with faces that can animate with expressions and emotions and communicate like humans, running with the help of AR and VR. It would then enable AI to provide tailored teaching, recognizing the learner's frustration or delight.

Future research should also emphasize Longitudinal Studies to capture the long-term effects of AI on language retention and its transfer into real-world skills. Lastly, the field is transitioning toward “Hybrid Pedagogy,” in which AI takes over for mundane teaching and learning, and human teachers remain as the deliverers of the socio-emotional scaffolding that cannot be automated, and the support for critical thinking that cannot be replicated. Incorporating machine precision and human empathy can foster an inclusive, engaging, and effective learning environment for all students.

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