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The Impact of Artificial Intelligence on English Language Learning in Higher Education

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Abstract:
The way English language learning is learned has been greatly changed and transformed by the use of Artificial Intelligence in higher education. It has enhanced personalised instruction, offered adaptive learning environments, and provided real-time feedback. This study explores the multifaceted impact of Artificial Intelligence on English language learning among students in higher educational institutions. The focus was on improving students' engagement, language skills and teaching efficiency. Teachers can customise learning experiences to fit individual needs and address the limits of traditional teaching methods by using AI tools, such as Intelligent Tutoring Systems, Automated Assessments, and Natural Language Processing applications. The results highlight both the advantages and disadvantages of AI while stressing the need for ethical considerations and technological improvements to obtain the best learning outcomes. Finally, this study will help in understanding how Artificial Intelligence is significant in reshaping the education framework in higher education. It provides important insights for policymakers, educators, and developers who aim to optimise the role of Artificial Intelligence in helping students with language learning.

Keywords*: Artificial Intelligence, higher education, English language learning, personalised instruction, adaptive learning environments.*

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Introduction

This paper focuses on the influence of AI on English language learning in higher education institutions, considering the smart use of Intelligent Tutoring Systems, Automated Assessment, and NLP applications. It integrates findings from current studies on the expandability of AI decisions, diverse problem solving, simulation models, and collaboration between Artificial Intelligence and humans. It also considers the benefits and drawbacks of these technologies, their impact on teaching methods and institutional policies, and the challenges that must be met to ensure fair and effective English language education in the future.

Significance of the study

This study is significant for understanding the impact of Artificial Intelligence technologies, such as intelligent tutoring systems, automated assessments, and natural language processing applications, on English language learning in higher education institutions. While addressing the challenges related to explainability, trust, and fairness, it has also focused on the benefits, such as students' involvement in learning, improvements in language skills, and efficiency in teaching. The study also

focuses on human-centred and ethical design, as well as providing important insights for policymakers and educators to improve the role of Artificial Intelligence in the field of education. This emphasises the need for collaboration between human creativity and AI innovation to create effective and equitable learning experiences for students. This study changes educational frameworks by promoting transparency and inclusivity in the educational processes.

Scope of the study

The scenario of learning the English language in higher education has witnessed a large-scale change after the inclusion of Artificial Intelligence. Although the scope of Artificial Intelligence is vast, the present research is limited to identifying AI tools such as Intelligent Tutoring Systems, automated assessments, and natural language processing applications and their effectiveness in improving English language learning in higher education institutions. This study focuses on the benefits of using such AI tools and considers challenges and limitations, such as accessibility, adaptability, and teaching methods. The study also explores how AI tools have proven to be beneficial not only to educators but also to learners in the changing scenario of English language learning in higher education institutions.

Research Objectives

1. To examine the need for professional development and educator involvement in the design and implementation of AI-driven language learning tools to ensure alignment with educational goals.
2. To develop and propose a context-sensitive evaluation framework that integrates both quantitative performance metrics and user-centred objective criteria for assessing AI tools.
3. This study aimed to analyse the effectiveness of AI feedback in terms of accuracy and its impact on learner autonomy, motivation, and long-term language proficiency.
4. This study explores human-centred AI (XAI) evaluation approaches, focusing on users' ability to achieve their learning goals through AI explanations.

The Landscape of AI in English Language Learning

Intelligent Tutoring Systems: Personalisation and Adaptivity

Intelligent Tutoring Systems (ITS) are among the most effective and prominent AI applications in English language learning. This system uses advanced machine learning algorithms and natural language processing to meet the needs of learners, adjust instruction content, and provide real-time personalised feedback. The main idea behind an Intelligent Tutoring System is based on the simulation of "expert tutors" in which teachers can change their teaching practices according to the emotional state of learners, their misconceptions, and what they want to say. Similar to how AI systems in healthcare simulate the thought process of experienced doctors (Bennett and Hauser 2), in the same way, Intelligent Tutoring Systems (ITS) in language learning aim to imitate, possibly even improve upon, the structured guidance provided by human instructors. The adaptivity of Intelligent Tutoring Systems (ITS) is based on data-driven models. These models often take the form of reinforcement learning agents or Markov decision processes, as they improve the learning process based on how well students perform (Bennett and Hauser, 3). For

instance, English vocabulary designed for Intelligent Tutoring Systems can monitor students' understanding of English words. It can then adjust the frequency and order of practice exercises and suggest targeted activities for review. Another application, such as Natural Language Processing, can be used to write instructions to thoroughly examine students ‘essays. They are helpful in identifying language errors and providing suggestions for improvement of the same.

The potential of Intelligent Tutoring Systems is derived from their ability to expand easily and provide tailored instructions to a large number of students. Intelligent Tutoring systems have the capacity to provide individual attention to each student, which they might not get in higher education institutions, where the number of instructors compared to students is not ideal. AI-driven systems can “approximate optimal decisions even in complex and uncertain environments” (Bennett and Hauser 3). This feature is crucial for diverse learning groups with different and unique learning needs and styles.

However, the implementation of an Intelligent Tutoring System comes with challenges. A major concern is how clearly it explains the recommendations and feedback. As Bharati et al. argue in their review of explainable AI (XAI) in healthcare, users must be able to “understand and trust” the decisions made by AI systems if they are to be widely adopted (Bharati et al. 2). If students are unable to comprehend and question the logic behind system-generated feedback, their trust and learning engagement may suffer in the learning environment. This highlights the importance of transparency, interpretable models, and user-friendly designs that encourage productive interactions between learners and systems.

Automated Assessment: Efficiency, Consistency, and the Problem of Trust

Automated Assessment Systems are another significant Artificial Intelligence tool that proves useful in English language learning. It uses AI algorithms and often relies on methods such as machine learning and Natural Language Processing to assess students' work,, particularly in the areas of essay writing, oral presentation, and interactions. There are numerous benefits associated with it, such as increased efficiency, consistent grading, and the ability to provide constructive feedback at a level that human evaluators cannot achieve. In their analysis of XAI methodologies, Bharati et al. note that automated systems can “eliminate therapeutic and medical errors that are inescapable” in human clinical practice by virtue of their repeatability and objectivity (Bharati et al. 3).

A similar point can be applied to educational assessments; Artificial Intelligence can lessen human biases, tiredness, and inconsistency. For instance, an automated essay grading machine can assess a large number of students’ scripts faster than human evaluators. They can provide instant feedback on grammar, coherence, overall structure and critical thinking skills.

However, Automated Assessment Systems face challenges owing to the complexity of natural language and the nuanced way in which humans communicate. One frequent criticism is the “black box” aspect of many AI tools, which often produce scores or feedback without providing a proper explanation for their decisions. Labarta et al. focused on their study of XAI, the helpfulness of AI-generated explanations is crucial for engendering trust and allowing users—whether students or instructors—to “question AI decisions” (Labarta et al.

2). When AI assessments contradict human judgment or fail to recognise creative, unconventional, or situationally appropriate language, this lack of transparency results in reduced confidence in the system.

Furthermore, the Automated Assessment System must seriously consider issues such as fairness and inclusivity. Bennett and Hauser observed in the context of healthcare, "careful formulation of the problem and state space is necessary to handle" the diversity and complexity inherent in real-world populations. (Bennett and Hauser, 4). In English language learning, this means that there should be assessment tools that truly understand and respond to different linguistic variations, multicultural expressions, and various forms of the English language. If these issues are overlooked, they could result in biases and disadvantage some groups of learners.

Natural Language Processing Applications: Expanding the Horizons of Language Learning

Natural Language Processing has changed how we approach language learning experiences, making them more genuine, interactive, and deeply immersive. In higher education, there are some applications powered by Natural Language Processing, including chatbots, automatic translation, speech recognition tools, dialogue systems, and creative writing assistants. These tools play a significant role in enabling students to engage in simulated conversations, receive immediate corrected feedback, and explore a vast collection of linguistic resources suited to their proficiency and interest levels. Games and game-based platforms have played a key role in this context; they serve as "test beds for artificial intelligence research" and provide "controllable, cost-effective, and realistic simulators" for language use (Hu et al. 1). For instance, dialogue-based games and collaborative problem-solving environments enable students to practice English in contextually rich, goal-oriented settings. The benefits of these platforms are not limited to language practice; they go beyond that, promoting critical thinking, negotiation, and communication across cultures. The use and integration of Natural Language Processing into problem-solving environments can create more opportunities and possibilities for enhancing the creativity of learners. Gizzi et al. observe that the capacity for "creative problem solving (CPS)—the ability to adapt knowledge flexibly and generate novel solutions—is a hallmark of sophisticated intelligence and a vital skill for language learners (Gizzi et al. 1). Platforms powered by AI can support Cyber-Physical Systems by providing ill-structured problems, allowing learners to try out language in different contexts, and giving tailored feedback. However, the integration of Natural Language Processing applications in English language learning also faces challenges regarding their ability to explain and user agency. Labarta et al. argue that the effectiveness of XAI is highly context-dependent and that "measuring the effectiveness of XAI methods without users can only reveal a limited amount of information" (Labarta et al. 2). It is essential to involve both students and teachers in the evaluation and refinement of NLP tools. This involvement ensures that any explanation offered is not only technically correct but also valuable and meaningful for teaching purposes.

Explainability frequently arises as a central theme in the evaluation of AI-powered language-learning tools. As Bharati et al. pointed out in the context of healthcare, "explainability means that a ML model and its results can be explained in a way that a person can understand" (Bharati et al. 4). This difference is important in

education, where goals extend beyond mere prediction or clarification. They also include learner empowerment, metacognitive development and ethical accountability. Labarta et al. propose that Explainable Artificial Intelligence (XAI) should be evaluated by its ability to "enable the user to judge, trust, and question AI decisions" (Labarta et al. 6). In English language learning, this implies that the system offers feedback but explains its reasoning in a clear and understandable language. For instance, an AI writing assistant can pinpoint grammatical mistakes, clarify the underlying rules, and offer alternatives, thus helping with immediate correction and supporting deeper and longer-term learning.

The need for explainability becomes more important when considering the risk of relying too heavily on AI recommendations and suggestions. As demonstrated in Labarta et al.'s user study, users may be "9.8 times more likely to trust the black-box AI with a misleading explanation than just the black-box AI," even when the AI makes erroneous decisions (Labarta et al. 4). In an educational environment, this could lead to a decline in critical thinking skills and the possibility that AI could reinforce misunderstandings or biases. Moreover, the challenge is made more complicated by the technical complexity of many current Artificial Intelligence models, especially those that use deep learning. As Bharati et al. observe, "Deep Learning models…may often provide results that are beyond the comprehension of non-experts," with millions of parameters and feature representations that defy straightforward interpretation (Bharati et al. 5). Surrogate models, visualisation tools, and user-friendly explanation interfaces must be developed to overcome this issue.

Creativity, Adaptivity, and Human-AI Collaboration

A frequently discussed common theme in the literature is that AI can enhance–not replace–human creativity and involvement in the learning process. Gizzi et al. argue that "creative problem solving (CPS) is characterized by its flexibility or adaptability to handle novel problems," and that AI systems should be designed to "discover new concepts for accomplishing the task, by modifying the agent's initial conceptual space" (Gizzi et al. 6). In English language learning, this perspective moves away from considering AI as a perfect source of answers and treats it as a collaborator and a co-learner. Game-based platforms clearly illustrate this idea, offering an environment in which learners and AI agents can engage with each other and collaboratively develop meaning. As Hu et al. note, "games provide virtual worlds for AI to explore" and for learners to experiment with language, strategy and identity (Hu et al. 1). The combination of human and AI creativity is especially clear in activities such as collaborative storytelling, debates and problem-based learning. The unexpected nature of human inputs and the adaptable qualities of AI can create valuable and novel learning experiences for students to learn.

Bennett and Hauser suggest that "combining autonomous AI with human clinicians may serve as the most effective long-term path" in healthcare (Bennett and Hauser 3). A similar argument can be made for the education sectors. The most useful and effective teaching methods will likely be those which skilfully bring together human strengths, such as empathy, contextual judgement, and cultural sensitivity, along with an AI system that offers scalability, consistency, and adaptive feedback. However, to make human-AI collaboration more effective, careful attention is required in the design of the interface, procedures, and intuitive policies. As Bharati et al. warns, "organizational difficulty posed by XAI can be mitigated

via AI deployment management plans", and communication problems can be alleviated by "patient instruction that facilitates the use of artificial intelligence" (Bharati et al. 3). This means that there is a need for professional development, the involvement of educators in the process of designing tools, and continuous evaluation to ensure that AI tools genuinely support the achievement of educational goals rather than disrupting them.

Challenges and Future Directions Despite the effective and substantial progress made by AI-driven language learning tools, many challenges remain. First, there is an urgent need to create a strong context-sensitive evaluation framework that blends quantitative performance metrics with user-focused, objective criteria. Labarta et al. advocate for "objective human-centered XAI evaluation," in which the effectiveness of explanations is measured by users' ability to "reach their goals in terms of objective task performance" (Labarta et al. 6). In practice, this means that studies should be designed to evaluate not only the accuracy of AI feedback but also its influence on learner autonomy, motivation, and proficiency in the long term.

The second issue that needs to be resolved is that bias and fairness in AI-driven assessments and instructions require constant attention from educators. As Bennett and Hauser observed, disparities in data, representation, and algorithmic design can result in suboptimal or inequitable outcomes (Bennett and Hauser 4). Therefore, in the context of English language learning, diverse and representative datasets, clear and scrutinised algorithms, and policies that offer protection against linguistic, cultural, and socioeconomic discrimination are required.

The third challenge is that the role of teachers and other human stakeholders in AI-mediated learning environments must be re-evaluated. Educators should be active participants as co-designers, mediators, and critical thinkers, rather than passive consumers. This aligns with Gizzi et al.'s call for frameworks in which "the agent manipulates its currently known conceptual space in order to discover new concepts" (Gizzi et al. 6). This process involves social interaction, dialogue, and computation. Finally, the ability of Artificial Intelligence to boost creativity and higher-order thinking in language learning remains unexplored.

Conclusion

Artificial intelligence has revolutionised all fields, including education. English language learning has changed the way English is learned in higher education through AI-driven tools such as Intelligent Tutoring Systems, Automated Assessment Platforms, and Natural Language Processing. AI provides more opportunities for personalisation, expanding access, and innovation. While these technologies present considerable challenges, including issues of explainability, trust, fairness, and human agency, it is imperative to focus on principles such as clarity, inclusivity, and human-centred design to fully realise the potential of AI in language education. AI with clear explainability quality should be prioritised, as it builds trust, supports meaningful learning, and develops critical engagement. Teachers and learners should actively participate in the design, evaluation, and improvement of AI systems. This ensures that technological advancements fulfil both educational and ethical goals.

In conclusion, it can be said, AI will not only play a role in shaping the future of English language

learning. in higher education. This will be the result of an interaction between human creativity, technological skills, and the ongoing desire for understanding and communication. As AI continues to develop, we must maintain our shared commitment to providing language education that is fair, impactful, and motivating

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