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A Systematic Review of Research on the Applications of Artificial Intelligence in Learning English as a Foreign Language

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Abstract
The incorporation of Artificial Intelligence (AI) tools into English language learning in higher education has recently gathered momentum. This systematic review probes over the robust realm where Artificial Intelligence (AI) is amalgamated into English Language Learning (ELL), examining the many-sided and heterogeneous impact of AI technologies on English language acquisition. The current study utilizes the five-step method form to locate AI tools that can be entailed in EFL classes to augment learners' motivation and engagement while diminishing their learning anxiety (Wolfswinkel, Furtmueller, & Wilderom, 2013) [40]. A thorough and methodical review of pertinent literature was performed across various electronic databases, comprising but not circumscribed to Google Scholar, IEEE Xplore, PubMed, ERIC, Web of Science, and Sage. The review in the current study covers articles published between 2018 to 2014. The analysis of the research and studies pinpointed the impact of AI tools on three prime areas, namely students' motivation, engagement, and learning anxiety. Lastly, the discussion of methodological challenges draws attention to the variety of research strategies, stressing the dire need for ethical considerations in the incorporation of AI into language education. This overview not only provides a meticulous and particularized understanding of the current landscape but also calls on educators, researchers, and policymakers to work collaboratively to mold a future where AI augments and transforms the process of learning English into an exhilarating and all-inclusive experience.

Keywords: Artificial Intelligence (AI), English Language Learning (ELL), Motivation, Engagement, Learning Anxiety

Introduction
The application of technology in the precipitately capricious world of education has become more widespread, metamorphosing conventional and long-established teaching techniques and introducing innovational strategies for both learning and teaching (Crompton & Burke, 2023) [13]. One pivotal technological development that has gained momentum within the education sector is Artificial Intelligence (AI). As AI continues to propel forward across diverse and alternate industries, its ability to alter teaching practices, predominantly in language education, has demonstrated and expounded itself as a viable area of study and investigation.

The utilization of AI technologies in ELL environments can prospectively address long-standing issues, individualize learning experiences, and hone overall proficiency results. Nonetheless, the degree to which AI has been advantageously put to use in ELL, its upshots on learners, and the studies methodologies used in pertinent studies are still subject to ongoing research (Weng & Chiu, 2023) [39].

Facets such as motivation, engagement, and learning anxiety have a significant impact on English language learning. One of the most promising technologies that can be utilized to enhance the aforementioned facets in higher education is Artificial Intelligence (AI). AI can tailor language learning to address various learners' needs by creating ideal learning environments (Nishant, Kennedy & Corbett, 2020) [32].

Learners' Motivation
Motivation is defined as the underlying reason or reasons for intentional behavior (Harmer, 2001) [22]. It works as the compelling force that directs and molds the actions of individuals toward achieving certain goals. It galvanizes them to engage in tasks, pursue success, take initiative, establish objectives, and persist in their efforts. When a learner exhibits motivation, it

is reflected in their commitment as well as their emotional, behavioral, and cognitive engagement (Ormrod, 2010) [34]. Motivation is pivotal in determining the varying levels of success in language acquisition since motivated students learn more efficaciously and maintain their learning efforts over extended periods. These motivated learners demonstrate certain qualities such as tenacity, collaboration, overcoming challenges, optimism, and a stout urge to acquire new knowledge (Gass, Behney, & Plonsky, 2020) [20]. Ortega (2014) [35] argues that motivation entails the keenness and avidity to learn a second language along with the perseverance dedicated to that learning.

Learners' Engagement

Student engagement in the learning process pertains to the extent of attention, curiosity, interest, optimism, and enthusiasm exhibited by students during their education, which can lead to the motivation necessary for them to learn and advance academically (Anita & Susilawati, 2018) [3]. Fredricks, Blumenfeld, and Paris (2004) mention that student engagement is germane to students' motivation to learn and how vigorously they engage in their learning. When students are engaged in the classroom, they are more likely to finish their assignments, participate in classroom discussions, and accomplish academic success. Understanding and furthering engagement, correspondingly, has become a rudimentary emphasis in educational practice and research to intensify students' learning outcomes.

English Language Learning Anxiety

Foreign Language Anxiety (FLA) refers to the feelings of fear, unease, and nervousness that occur in some learning situations such as speaking, listening, and learning a foreign language (Richards, 2018) [36]. Language anxiety occurs when a student experiences fear or uneasiness before engaging in language acquisition activities. The presence of anxiety in the classroom can have an impact on a student's confidence, communication skills, overall competence in the language, and performance on exams. Anxiety can lead to a student feeling nervous and causing them to blank out (Hu & Wang, 2014) [25].

Artificial intelligence (AI)

Artificial intelligence deals with creating programs that make a replica of human thought processes. It aims to grasp the human intelligence essence, along with its diversified dimensions and components (Al Mukhallafi, 2020) [1]. AI yearns to mimic human cognitive functions in real-world situations, easing the reproduction of certain skills such as recognizing speech. These cognitive abilities are then translated into computational models to pinpoint challenges and also make decisions. The prime purpose of this sphere of research is to generate applications energized and generated by intelligence, while its ultimate ambition is to reach a level of intelligence akin to that of humans (Han, 2018) [23].

The Characteristics of AI

According to Al-Shawabkah (2017) [2], artificial intelligence appertains to the capacities imparted to computers that empower diverse performance systems to evince intelligence and ape human actions. It is also described as a branch of computer and information technology that creates, examines, and progresses computer systems that replicate human cognitive functions. Artificial intelligence (AI) is classified in this study as making use of AI systems for teaching and learning English, aimed to enhance the means of sorting, classifying, and selecting academic material that caters to students' learning needs and skills. It further augments the variety of educational pathways and learning resources in conformity with learners' levels. Moreover, Artificial intelligence (AI) is used to refine and enhance assessment techniques and teaching approaches by personalizing self-directed learning experiences and providing simulations through intelligent and expert systems.

Artificial Intelligence in Higher Education

The utilization of (AI) in higher education (HE) has expeditiously escalated over the last five years (Chu, Tu & Yang, 2022) [10], accompanied by an upsurge of new AI tools available. Researchers (such as Chen, Chen & Lin, 2020 [9]; Crompton, Bernacki & Greene, 2021) have pinpointed the privileges, noteworthiness, and significance of artificial intelligence for both learners and educators and learners in higher education. These privileges incorporate the AI ability to tailor instruction to teach to learners' diverse needs (Verdú, Regueras & Gal, 2017) [37], in providing tailored instantaneous feedback (Dever *et al*., 2020) [16], in assessing students' performance (Baykasoğlu *et al*., 2018) [5], and in foreseeing learners' academic achievement (Çağataylı & Çelebi, 2022) [6]. The studies aim to instruct teachers on the efficacious application of artificial intelligence in higher education.

The Applications of Artificial Intelligence in Language Learning

There are a variety of AI tools that have been used for learning foreign languages. These incorporate many tools including virtual learning environments, machine translation applications, chatbots, automated writing evaluation systems, and intelligent learning management systems. There are only a limited number of these tools, however, that have been explicitly evolved to promote interactive activities that are intent on augmenting learners' attitudes, engagement, and motivation, while mollifying students' learning anxiety.

According to Kim, Cha, and Kim, (2019) [29], the utilization of chatbots and artificial intelligence (AI) tools in learning English as a foreign language has recently proliferated. Hence, the learners are provided with worthy opportunities to practice language skills in an interactive and supportive artificial setting (Baidoo-Anu & Ansah, 2023) [4]. To be more specific, chatbots are used to reproduce and duplicate human conversation and provide instantaneous feedback which allows learners to get engaged in bona fide contexts (Caldarini, Jaf & McGarry, 2022) [8]. AI-based language learning platforms can be adjusted and customized to teach to students' specific learning needs, which makes the learning process more effective. Furthermore, learners can be assisted by diverse online language learning platforms that are powered by AI, encompassing engaging lessons, grammar clarifications, and vocabulary activities. This helps students to be in charge of their education while focusing on their individualized objectives and needs to grasp the English language (Huang, 2023) [26].

The current study aimed to explore the functions that AI tools serve when integrated into English language learning;

examine the effectiveness of AI applications in honing EFL learners' motivation and engagement; and investigate the impact of AI applications on EFL learners' anxiety.

Materials and Methods

A systematic review is an approach that is employed to synthesize information that maps out exploratory research questions employing meticulous selection, identification, and examination of extant data (Colquhoun et. al., 2014) [11]. A systematic review helps delineate the existing literature, pinpointing research gaps, expounding research objectives, and offering recommendations (Zhai, 2023) [43]. The current study utilizes the five-step method to detect AI applications that can be embraced in EFL classes to promote learners' motivation and engagement while easing the learning anxiety encountered by students (Wolfswinkel, Furtmueller, & Wilderom, 2013) [40]. The current method, which is grounded in theory, assists the progress of a rigorous search and evaluation of the articles gathered from databases. The steps entailed in this approach incorporate pinpointing the scope of the systematic review, carrying out a search after establishing the sample selection, gauging the selected samples, and proffering the findings and recommendations (Zhai, 2023) [43].

The Systematic Review Process

The systematic review process in the current research entailed 3 principal steps. To pinpoint relevant research and studies in the literature, the first step aimed to determine and define inclusion and exclusion criteria (Zhai, 2023) [43]. The study selected empirical English journal publications that encompass AI applications in language learning and appertained to the higher education context. Furthermore, the journal publications aimed at learners' motivation, engagement, and level of learning anxiety and were also published recently as a sequence of AI swift advancement.

The second phase entailed carrying out search queries across the selected databases, which embraced IEEE, Wiley, Web of Science, Sage, ProQuest, Springer, and Science Direct. These databases were selected based on their pertinence to artificial intelligence and language learning. To identify relevant and suitable studies, some relevant terms were used such as "AI," "artificial intelligence," "EFL," "ESL," "motivation," "learning engagement," "learning anxiety," and "higher education" within the articles titles and abstracts. About 55 relevant publications were selected.

The next step focused on the selection of the final sample to be analyzed. The researcher refined the selection process so that it incorporated only the articles which were published in English. Moreover, The researcher examined the titles and abstracts of the articles to ensure that they appertained to AI applications that aimed at improving EFL learners' motivation, and learning engagement and uncovering the impact of AI tools on anxiety experienced by EFL learners in higher education.

The researcher established criteria to assess the articles that were selected which was performed using Microsoft Excel software. The researcher grouped the studies into three prime categories, namely motivation, learning engagement, and learning anxiety. Some studies were grouped into multiple categories, such as both learning engagement and motivation. Additionally, the studies were arranged into relevant subcategories based on their purposes, the AI tools examined, and their applicability in higher education for learning EFL. The researcher also evaluated the methodologies used in each study and summarized the findings of the chosen articles to create a suitable analytical framework.

Results and Discussion

Motivation and Engagement

The implementation of chatbots in higher education has been shown to enhance students' motivation, enthusiasm, and confidence (Fryer, Nakao & Thompson, 2019 [19]; Guo *et al*., 2022; Deng, & Yu, 2023 [15]; Mendoza *et al*., 2023 [31]) it has also boosted their intrinsic and extrinsic motivation in language learning and encouraged them to dedicate time and effort (Ehtesham-Ul-Haque, 2024; Wang *et al*., 2022) [17, 38]. Specifically, in a study by Yin *et al*. (2021), the experimental group demonstrated greater competency in learning and achieved significantly higher levels of intrinsic motivation. Additionally, AI-driven conversational agents increased learners' motivation to engage in communication in the target language (Kiuru, 2020) [30]. Moreover, chatbots increased student engagement (Guo *et al*. 2023 [21]; Huang, Hew, & Fryer, 2022; Karaoglan Yilmaz, & Yilmaz, 2022 [28]) and improved students' learning outcomes (Okonkwo, 2012; Qu, 2022; Wu, 2023 [41]).

Learning Anxiety

The integration of chatbots in learning English contributed to reducing students' learning anxiety (Hawanti, 2023) [24]. To demonstrate, Chatbot-human interaction improved students' performance and minimized their speaking anxiety (Çakmak, 2022 [7]; Bashori *et al*., 2022; Boa, 2019; Fryer, Nakao, Thompson, 2019 [19]; Huang *et al*, 2022; Zhang, Zou, & Cheng, 2023; Lee, & Hwang, 2022; Deng & Yu, 2023 [15]).

Research has shown that the most frequently utilized AI technologies assisted in improving learners' motivation, and engagement and reducing their learning anxiety as well. In higher education EFL classes, AI tools served three main functions: Teaching assistants, personal tutors, and learning partners. Chatbots, functioning as teaching assistants, deliver academic information confidence (Fryer, Nakao & Thompson, 2019 [19]; Guo *et al*., 2022; Deng, & Yu, 2023 [15]). Additionally, chatbots reduce students' reading anxiety and enhance their reading performance (Shuyan Zheng, 2024). Chatbots offered valuable language learning experiences and significantly supported language learning (Huang, Hew & Fryer, 2019).

Taking into account the capabilities of AI tools, it is highly plausible that these technologies will have a great and positive impact on language learners' success, engagement, and motivation (Mendoza *et al*., 2023) [31], and reduce their learning anxiety as well (Deng & Yu, 2023) [15]. Additionally, the utilization of chatbot systems in education can offer personalized EFL learning experiences by accommodating and reconciling learners' needs and aiding educational resources at any place and time (Jeon, 2024). The use of such chatbots is predisposed to ameliorate academic performance, augment motivation and engagement, and minimize learning anxiety.

Conclusion

This research provides a systematic overview of studies released between 2018 and 2024 focusing on the utilization

of AI technologies in higher education to ameliorate students' motivation and engagement and lower their learning anxiety. Generally, the findings from the reviewed studies demonstrate a luminous future for AI innovations in EFL education. AI has indubitably impacted English language proficiency as well as learners' motivation, engagement, and anxiety.

Artificial Intelligence (AI) outstandingly improves English language learners' motivation and engagement by furnishing interactive and personalized learning experiences. AI-powered tools offer instantaneous gamified activities, and tailored content that cater to students' various learning styles and pace, which makes the learning process more efficacious and congenial as well. In addition, AI generates a low-pressure environment where learners can practice without fear of judgment, hence lowering anxiety.

Despite the efficacious role that AI plays in the language learning process, the human's role remains pivotal and indispensable. Teachers play a significant role in teaching student's learning needs, so it can be anticipated that AI can be used in English classrooms monitored by teachers.

The current systematic review not only lends a snapshot of the contemporary state of research at the intersection of ELL and AI but also paves the way for future investigations. As technology progresses and education advances, the themes unrevealed in this research tender valuable insights for policymakers, researchers, and educators. The narrative woven by AI technologies in English language learning is one of transformation, empowerment, and promise, inviting stakeholders to embark upon a joint and mutual journey toward a future where language education is inclusive, dynamic, and augmented by Artificial Intelligence possibilities.

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