

The Investigation on Recent Applications of Artificial Intelligence in Second Language Acquisition

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ABSTRACT

AI technology is not a new concept in the field of SLA and EFL. However, with the booming of technology development, AI technology has achieved many improvements in many aspects. The research is conducted with the goal of revealing the recent milestone of applying AI technology in activities for improving students' SLA process in EFL classrooms. Moreover, through the gathered data from previous, the researcher wants to identify the recent and future development trends of AI technology in the SLA support process with the hope that this information will contribute to the improvement of EFL classroom activities by stimulating EFL teachers/ lecturers to apply such type of technologies in their classroom.

Keywords: AI, SLA, computer assisted language learning (CALL)

1 Introduction

The field of Artificial Intelligence (AI) is a game-changer in computer science, designed to develop technology that performs tasks previously only possible for humans. From medicine and education to security and Second Language Acquisition (SLA), AI offers applications that are far-reaching and adaptable. SLA requires learners to navigate various external factors such as the environment, motivation, and personality while mastering a foreign language (Ellis, 2018). With its remarkable cognitive abilities, AI has been seamlessly integrated into the learning process as an efficient and reliable model for acquiring languages. By leveraging its innovative strengths, AI may soon transform society's approach towards Second Language Acquisition forever.

SLA is a darn complex and multifaceted beast! It involves all sorts of things like thinking, socializing, feeling, and talking (according to Dörnyei & Ryan (2015). Plus, it's awfully personal since everyone comes from their own background with different goals and motivations (Dörnyei & Ushioda (2013) say so too). So, when we bring in AI to help us with SLA, there are tons of crazy challenges and some exciting opportunities. Imagine having your learning experience totally customized just for you! Or how about constantly adapting to how you're doing? Pretty sweet possibilities. But while we're at it, let's not forget that AI can also support researchers and teachers by taking care of data analysis or handing out feedback (Heift & Schulze (2015) think so) which will ultimately enhance our understanding of the whole dang thing (Chapelle et al. (2016) agree)

This paper explores the exciting possibilities of AI for second language acquisition (SLA). First, we will delve into various theories and models that inform AI system design and development within SLA. Next, let's take a closer look at some real-world applications and examples of how AI systems are revolutionizing SLA in numerous domains such as vocabulary building, grammar refinement, pronunciation mastery, improving reading comprehension skills, enhancing writing abilities, refining oral communication with perfection in speaking skills and honing listening abilities while growing cultural awareness.



The following list of research questions was meant to be answered by the study for it to accomplish its goal:

Research question 1: What are the applications of AI in SLA in recent days?

Research question 2: How can AI help teachers/lecturers improve the SLA process of students?

2 Literature review

2.1 Second language acquisition theoretical framework

There is no theory to account for all the processes and factors involved in SLA, as it is a complex and dynamic process that involves multiple analyzes and interactions but theories about SLA can provide perspective and insights into SLA and the AI of SLA. Provide various implications and challenges in application. In this paper, we will briefly introduce three main theoretical approaches to SLA: generative grammar, functional grammar, and connectionism, and discuss how they relate to AI in SLA.

Generative grammar is a theory of language that views language as a system of rules that can generate an infinite number of sentences from finite resources. Innate grammar was developed by Noam Chomsky in the 1950s to explain how humans are able to make and understand new sentences they have never heard before. Innate grammar assumes that all humans are born with a universal grammar, which refers to similarities and differences in actual language use) and makes differences.

Based on generative grammar, the application of AI in SLA is found in two main areas: Natural Language Processing (NLP) and Intelligent Computer Assisted Language Learning (ICALL) NLP is a branch of AI that explores natural language through machines in the 19th century. NLP can be used to develop tools that can help students develop a variety of language skills, such as reading comprehension, spelling, translation, and pronunciation. For example, NLP can be used to create an interactive feedback system that can identify and correct student errors, provide explanations or suggestions, or introduce exercises or tests based on student needs or preferences (Crookes, 1992). ICALL is a branch of AI that designs and develops computer programs to facilitate or support language learning. ICALL can be used to create a flexible or personalized learning environment that can tailor instruction or content to the level, goals, style, or interests of students. For example, ICALL can be used to create vigilant teachers or agents who can monitor student progress, provide guidance or feedback, or engage students in discussion or interaction (Mitchell et al., 2013).

The blessings of making use of AI in SLA based totally on generative grammar are that it could provide novices with accurate and consistent linguistic information and comments, as well as get admission to a massive quantity of genuine or numerous language records. The negative aspects are that it could forget about the social and contextual aspects of language use and learning, which include pragmatics, discourse, subculture, or motivation. Moreover, it could face difficulties in coping with ambiguous or innovative language use that won't agree with the regulations or patterns of generative grammar.

Functional grammar is another linguistic idea that views language as a machine of resources for making meaning in context. Functional grammar developed by Michael Halliday and others is defined as a way of explaining how language is formed via the social and cultural purposes of conversation. Functional grammar assumes that language has 3 primary features: ideational, interpersonal, and textual. The ideational function is about expressing our reveal about the world, the interpersonal function is expressing our attitudes and relationships with others, and the textual function is set as organizing our messages into coherent texts. Functional grammar also distinguishes among field (the subject or situation remember of verbal exchange), tenor (the connection among the members), and mode (the channel or medium of communication) as the primary factors that affect our language picks.

Based on functional grammar, the application of AI in SLA can be found in two main areas: applied linguistics and computer communication (CMC). Corpus linguistics is a branch of linguistics that analyzes

and uses large collections of natural language texts (corpora). Corpus linguistics can be used to develop tools that can help students with different linguistic skills, such as vocabulary acquisition, collocation learning, genre analysis, and discourse analysis. For example, corpus linguistics can be used to create conformers or corpora browsers for comparison, or comparatively analyze their collocational or syntactic structure (Halliday & Matthiessen), 2004). CMC is a branch of communication that deals with the use of computer technology to facilitate or enhance human communication. CMC can be used to develop tools that can help students develop a variety of language skills, such as speaking, listening, pragmatics, and intercultural communication. For example, CMC can be used to create online forums or communities for students and native speakers to communicate with other students in real-time or asynchronously, using text, audio, or video, to participate in social activities which realistically or logically can or functions (Mitchell et al., 2013).

The advantages of using AI in SLA based on functional grammar are that it can provide learners with relevant and meaningful linguistic content, as well as opportunities to interact with different interlocutors and cultures. The disadvantages are students may need to acquire more conceptual and metacognitive skills, such as self-organization, critical thinking, and language use and learning skills, as well as, may face challenges in monitoring as linguistic content or information of the quality and reliability of students.

Connectionism is a conceptual theory that views language as a system of interactions between input and output information in neural networks. The connectionism theory developed by various researchers in the 1980s and 1990s to explain how humans can learn and process language through exposure and experience assumes a parallel, distributed network of units (nodes) of a network (layer), and language learning (It is the process of exchanging energy in weight connectionism theory distinguishes between declarative (implicit) and consumption of linguistic knowledge functional (explicit), and between linguistic semiotics (discreteness) and representation (continuity).

Based on connectionism, the application of AI in SLA can be found in two main areas: artificial neural networks (ANNs) and computer games. ANN is a branch of AI that develops and uses computer models that mimic the structure and function of biological neurons. ANNs can be used to develop tools that can help students improve different language skills, such as pronunciation, grammar, vocabulary and fluency. For example, ANNs can be used to develop speech recognition and synthesis systems that can recognize or prompt student speech, provide feedback or correction, or provide drills or exercise-based exercises or student performance outcomes (Tokowicz & MacWhinney, 2005). Computer games are a branch of fun that creates and uses interactive digital environments with rules, goals, challenges, and rewards. Computer games can be used as tools that can help students with various language skills, such as motivation, if they invest, strategy, and. creativity. For example, computer games can be used to create immersive or adaptive learning environments that can expose students to realistic or novel situations, stimulate their interest or curiosity, challenge their problem-solving or decision-making skills, or reward their growth or development (Mitchell et al., 2013).

Based on connectionism, the advantage of using AI in SLA is that it can provide learners with linguistic input and output, as well as feedback immediately and based on their feedback. The disadvantage is that it can oversimplify or neglect some aspects of the language structures and functions, such as rules or exceptions, practices or discourse, cultural or even sociolinguistics, may face limitations on consolidating or transferring language knowledge or skills learners acquire from particular content or tasks.

1.1. The history of using AI with SLA

The earliest applications of AI in SLA can be traced back to the 1960s and 1970s, when computer-assisted language learning (CALL) emerged as an alternative in language teaching and learning. CALL used

computers to give learners communicative exercises, exercises, presentations, and multimedia applications. Early examples of CALL programs include PLATO (Programmed Logic for Automatic Teaching Operations), LOGO (programming language for children), ELIZA (natural language processing program that simulated a psychiatrist) and imaginative development if so (Warschauer & Healey, 1998).

In the 1980s and 1990s, AI entered a new phase of SLA influenced by advances in Natural Language Processing (NLP), speech recognition, and machine learning. These technologies enabled the development of CALL systems that are amazing and intelligent enough to understand natural speech and produce natural speech, recognize and produce speech. Some outstanding examples of CALL programs in this generation that adapted to students' needs and wants are ATLAS (Advanced Technology for Language Acquisition System), PARSNIP (Parsing and Sentence Generation in Natural Language Processing), AutoTutor (an intelligent tutoring system that uses dialogue to teach lessons). This framework was primarily based on constructivist and sociocultural theories of learning and focuses on facilitating students' communication skills and metacognitive skills (C. Chapelle & Jamieson, 2008). According to another previous study (Heift & Schulze, 2007), this phase was characterized by developments in artificial intelligence, such as neural networks and natural language processing in language learning and teaching applications. Some examples of this phase include:

- Intelligent Tutoring System (ITS), which used artificial neural networks to model student thinking and behaviour, and provided flexible instruction and scaffolding based on student needs (Graesser et al., 2005).

- Natural Language Processing System (NLPS), which used natural language processing to analyze students' comments and input during natural language conversations or compositions, and provide information, guidance, and analysis (Heift & Schulze, 2007).

In the 2000-2010s, AI entered a new era in SLA, driven by the advent of big data, cloud computing, deep learning, and mobile devices. These technologies enabled the development and execution of powerful CALL systems personally capable of analyzing large amounts of data. Some notable examples of this era of CALL systems that can leverage cloud resources, learn from complex models, and provide ubiquitous learning opportunities are Duolingo (a game-based language learning platform), Rosetta Stone (language-enabled language learning software), ETS TOEFL Practice Online (web)-based test-preparation system) and were. These systems were based on data-driven learning principles and primarily student-centeredness, and focused on increasing student motivation, autonomy, and performance (Godwin-Jones, 2019). This period also is considered as phase 3: The expansion of AI in SLA and CALL in the studies of Heift & Schulze (2007), this stage featured the segmentation of language learning and teaching experiments into artificial intelligence, such as speech recognition, computer vision, chatbots, voice assistants, etc. Examples of this category include:

- The speech recognition system (SRS), which uses speech recognition to analyze the learner's speech input and output during spoken dialogue or composition, and can provide feedback, guidance and evaluation (Heift & Schulze, 2007).

- The Computer Vision System (CVS), which used computer vision to analyze and respond to students' visual input and output during dialogue or music-based pictures or videos

In 2020 and beyond, AI in SLA is expected to face new challenges and opportunities including advances in networks, social robotics, ethical issues, and human-AI business impacts. These advances will require they are advanced and efficient CALL systems that students will have through many ways can interact with them, such as gestures, hand gestures, and eye contact. Use social robots as teachers or peers; addressing ethical issues such as confidentiality, bias, and accountability; and collaborate with human learners or students to

achieve optimal learning outcomes. Some possible examples of these future-generation CALL systems include MALLBA (a highly adaptable language learning platform), Kirobo Mini (a connected robot that can converse in Japanese), and Replika (an AI chatbot provider). they develop emotional connections with users). appropriate), and squirrel AI (a flexible curriculum that combines human learners with AI instructors) (Cheng et al., 2020). Heift & Schulze (2007) also consider this phase as the late phase, this duration is characterized by innovative artificial intelligence technologies such as machine learning, deep learning, multimodal data analysis, virtual reality and augmented reality in language teaching and learning applications Some examples of this category are:

- Machine learning systems (MLS), which use machine learning to learn from large datasets of learner language production and processing, and provide insights, recommendations, and predictions for language learning and teaching

- Deep learning systems (DLS), in which deep learning is used to learn from complex datasets with high-level aspects of learner language production and performance, such as writing, speaking, images, videos, gestures, eye contact, facial expressions, emotions, etc.

1.2. The latest studies in AI applications for SLA.

The AI application in SLA has significantly changed in recent years, the remarkable studies in this filed are noted as:

Foreign language acquisition and augmented reality through artificial intelligence: Theory and research by Rahul R. Divekar et al. published in *Computer Assisted Language Learning* in 2021. This paper presents a cognitive language learning embedded environment (CILLE), which combines AI and XR to create a natural conversational interface for learning Chinese as a foreign language. The paper reports on a seven-week study of university students that showed significant improvements in vocabulary, comprehension and conversational skills.(Divekar et al., 2021)

A systematic review of AI-based language learning tools was published on Arxiv by Jin Ha Woo and Heeyoul Choi in 2021. This paper reviews the development of AI tools for language learning from 2017 to 2020 and draws focus on their methods, applications, and outcomes. The paper identifies machine learning and natural language processing as key AI techniques for error detection, feedback, and language analysis The paper discusses the educational implications of AI-based language learning tools and future research directions. (Woo & Choi, 2021)

Another research about how to train software using artificial intelligence as a teaching tool was published by Yuanyuan Liu in 2020. This research pointed out that the direction of using high-level AI tools in education environments has been approved and conducted in significant education environments. (Liu, 2020)

In 2020, a study with the aim of drawing attention to the fact that the e-learning components used in today's language courses may not be the same as the e-learning components a few years ago. Despite being strategically an entirely new approach to teaching, the advances in technology cannot be dismissed as so remarkable The results of this pilot study clearly pointed out that the existing e-learning platform is not an attractive option for Generation Z students anymore, who want to collaborate and communicate with each other as they are using Facebook and other social media platforms to do it.(Pikhart & Klímová, 2020)

Moreover, in 2020, a study designed and tested a writing program for a communicative language learning environment supported by a toy-based robot and tested the writing program based on the instructional needs of young language learners for communication in language development was published by Cheng et al., 2020). It was then analyzed and revised based on feedback from target audiences. Communication and communication strategies and developed a writing program guided by sociocultural principles in second

language acquisition and TELL Research shows that the program can help engineers add robot-based toys to consumption language learning of communication, especially children's robots in a context-based learning environment - and connecting them with IoT-based toys. Through a robot-based toy in which the child was engaged in a situation-based learning environment. In order to shed light on some of the key challenges in establishing an interactive language learning environment for CRI, which is an important issue in TELL, a curriculum design approach and theories of hearing practice are presented. (Cheng et al., 2020)

3 Materials and Methods

Finding answers to specific questions is a fundamental goal of scientific research. Quantitative research and qualitative research are the two main methods used in the research process to collect and interpret data.

Qualitative studies are a kind of study that objectives to explore and recognize the meanings, experiences, and perspectives of human beings in a particular context or scenario. Qualitative studies do not rely upon numerical data or statistical analysis but use words, pictures, sounds, and other styles of non-numerical statistics. Qualitative studies are frequently used to answer questions such as “how”, “why”, and “what” rather than “how many” or “how lots”.

Qualitative research may be labelled into different types primarily based on the motive, design, and techniques of information collection and analysis. Some of the not unusual sorts of qualitative research are: Ethnography: Ethnography is a type of qualitative study that includes analyzing the lifestyle, beliefs, values, and practices of a group of humans of their herbal placing. Ethnographers immerse themselves in the lives of the people they examine, frequently for an extended time period, and use methods such as player remarks, interviews, field notes, and files to gather records. Ethnography objectives to provide a holistic and certain description and interpretation of the way of life and conduct of a set of humans (Creswell & Poth, 2018)

Narrative inquiry: Narrative inquiry is a sort of qualitative research that focuses on the memories and narratives that human beings talked about their lives and stories. Narrative researchers gather statistics by way of eliciting testimonies from people or companies, both orally or in written form, and examine them for themes, patterns, meanings, and implications. Narrative inquiry ambitions to understand how human beings construct their identities, values, and worldviews through storytelling (Clandinin & Connelly, n.d.)

Phenomenology: Phenomenology is a kind of qualitative research that explores the lived reports and meanings of a phenomenon or idea from the attitude of the humans who have skilled it. Phenomenologists acquire statistics by using carrying out in-depth interviews with people who have skilled the phenomenon of hobby, and analyze them for commonalities, variations, and essences. Phenomenology targets to describe and recognize the essence and that means of a phenomenon as it's miles perceived with the aid of the members (Moustakas, 1994)

Case study: Case observation is a sort of qualitative study that includes in-depth research of a single or a couple of cases inside a real-life context. Cases may be about people, agencies, groups, events, programs, or phenomena. Case study researchers acquire information by means of using a couple of sources of proof which includes observations, interviews, files, artefacts, and data, and examine them for topics, styles, relationships, and factors. Case study aims to provide wealthy and comprehensive expertise on cases within their context (Yin, 2014)

Grounded research: grounded research is a sort of qualitative study that involves generating a principle or clarification from the information accumulated from the sector. Grounded idea researchers collect information through the usage of strategies together with interviews, observations, files, and memos, and examine them using an iterative process of coding, categorizing, comparing, and integrating. Grounded

theory pursuits to increase a concept that is grounded inside the records and explains the manner or phenomenon beneath look at (Corbin & Strauss, 2012)

One of the forms of qualitative research is documentary examination, which refers to using files as a source of records in qualitative research. Documents are any written or visible materials that incorporate statistics relevant to the study's subject matter or query. Documents can be categorized into primary and secondary sources, depending on their starting place and cause. Primary assets are authentic documents that had been created via the humans or businesses concerned inside the phenomenon below study, together with diaries, letters, reviews, transcripts, pics, movies, etc. Secondary assets are documents that have been created by means of others who analyzed, interpreted, or summarized the primary assets, including books, articles, opinions, opinions, and many others. (Bowen, 2009)

The documentary examination may be a valuable technique for qualitative research for diverse reasons. First, it is able to offer to get right of entry to facts that might not be available through different strategies, such as historic events, cultural practices, private reviews, etc. Second, it could supplement and triangulate other methods, consisting of interviews and observations, by supplying additional or alternative views, proof, or context. Third, it can reduce a number of the ethical and practical demanding situations associated with different techniques, which include obtaining consent, ensuring confidentiality, building rapport, and so forth. (Bowen, 2009)

This study is conducted under qualitative research type with the documentary examination of various documents with the goal of revealing the answer to two research questions.

4 Results and Discussion

Recent research has explored the applications of Artificial Intelligence (AI) in Second Language Acquisition (SLA) in the classroom. The research shows that AI technology has advanced significantly in recent years and has been utilized in various ways to enhance the learning experience for students.

4.1. Applications of AI in Second Language Acquisition

By leveraging Extended Reality (XR) technology and Artificial Intelligence (AI), Cognitive Language Learning Embedded Environments (CILLE) are being developed and implemented in classrooms across the world. Unlike previous technologies that simply offered speech recognition and scripted responses, CILLE allows AI to completely transform the classroom environment and offer a unique language learning experience. Through interaction with virtual objects, conversing with AI-powered avatars, and real-time feedback, students are more engaged and motivated than ever before. The new system offers an unprecedented level of language exposure, marking a significant improvement over previous AI language technologies.

Advancements in machine learning and big data technology have made error recognition and auto-correction in second language acquisition (SLA) an increasingly effective application of AI. This is particularly important in computer-assisted language learning. The AI-based software can recognize language errors such as syntax, vocabulary, grammar, and pronunciation and provide immediate feedback to students. The system is also able to track students' progress and personalize learning materials to better suit their needs. This technology not only saves teachers time and effort, but also enables students to receive accurate feedback that is critical to successful language learning.

The changing role of lecturers in the classroom has been a popular topic of research. Rather than just being technology consumers, lecturers are now becoming key players in the development of AI tools with specific functions and target audiences. This greater involvement in AI education and application can lead to enhanced classroom efficiency for teachers. For example, teachers can create individualized AI-based activities and assessments according to students' skill levels, learning preferences, and interests. The AI

system's data can be used to track and monitor student performance and teachers can provide prompt and appropriate assistance if needed. This collaborative effort between humans and AI can encourage a more effective and productive learning atmosphere for students.

Amidst the onslaught of Facebook and Twitter, some students have lost their interest in Learning Management Systems (LMS), as they provide countless sources of amusement, knowledge, and social harmony, competing with conventional education systems. This poses a challenge for educators, who need to find innovative ways of incorporating social media into learning. For instance, language learning can be engineered through Facebook groups dedicated to discussions, Twitter for confined prose activities, or visual storytelling through Instagram. By exploiting the benefits offered by social networks, teachers can provide more active, cooperative, and genuine learning practices for students.

In order to create a more engaging and interactive learning environment, speech-recognition AI toys may be utilized in classrooms. Alongside XR or VR technologies, this can offer an exceptional educational experience for students. For example, teachers may utilize AI-fueled toys or robots to enlighten pupils on vocabulary or grammar rules, while also encouraging them to partake in activities that involve roleplaying, storytelling, or games. This method is proven to stimulate students' curiosity, creativity, and social skills whilst enhancing language learning in a way that is fun and unforgettable.

The vast opportunities presented by AI in SLA have recently brought about significant changes in the way it is taught and learned. There may be some potential distractions, but leveraging the strengths of AI can lead to more effective and engaging learning experiences for students. By creating a more personalized approach, educators can effectively utilize AI technology.

4.2. Exploring the Potential of Artificial Intelligence in Enhancing the SLA Process: Future Implications for Teachers and Learners

In the world of second language acquisition (SLA), there is promising potential for the integration of artificial intelligence (AI) to change the way we learn languages. The innovative and customizable solutions that AI has to offer educators can personalize language learning experiences and overcome some of the challenges that arise in the process. A closer look into the future of AI in SLA shows a need for more advanced and intelligent AI packages, calls for interdisciplinary collaboration and integration and stresses the importance of ethical and responsible uses of such technology.

AI for SLA has the potential for further development as more advanced AI packages emerge. To enhance AI programs for SLA, more advanced algorithms, models, techniques, and technology can be utilized. For instance, deep learning algorithms can assist AI programs in comprehending and predicting learners' language skills. Additionally, reinforcement learning can create personalized learning strategies based on learners' interests. With generative adversarial networks (GANs), realistic and captivating language learning materials like interactive games and videos can be produced. It is also probable to combine natural language understanding (NLU) and computer vision into AI programs for SLA, which could lead to more immersive and interactive learning opportunities. Consequently, these advancements have the potential to make AI applications for SLA more adaptable, personalized, and tailored to the unique needs and preferences of each learner.

The need for AI in SLA research requires a multidisciplinary approach. SLA is not a simple process but rather involves multiple factors like cognitive, social, linguistic, and cultural elements. Through interdisciplinary research, experts from various domains can harmoniously collaborate to address the challenges and opportunities of AI in SLA development. For instance, linguists and computer scientists working together can develop more effective and accurate AI language-processing programs. Additionally, psychologists and educators can work together to design AI assessment tools to personalize feedback and

evaluate language skills. Lastly, sociologists can analyze the cultural and social factors affecting language studies to implement more inclusive and sensitive AI programs that recognize individuality.

In future research, it is imperative to pay more attention to the ethical and responsible use of AI in SLA. It is essential that AI applications for SLA are aligned with the needs and values of society, learners, and educators. By utilizing AI in an ethical and responsible manner, the rights and interests of learners and educators can be protected, including issues related to accountability, privacy, inclusivity, transparency, and equity. Additionally, the quality and integrity of SLA education and research can be enhanced.

In order to ensure fairness and inclusivity, AI-powered assessment tools must be designed to minimize any biases while treating all individuals equally. Additionally, AI programs must be transparent and accountable, providing clear explanations as to how they function and what data they are utilizing. The ethical frameworks and principles to guide the use of AI in SLA should always prioritize both the well-being and autonomy of the learners and educators.

Innovative and custom solutions for language learning obstacles can be provided by the potential of AI, which has the ability to modify the SLA process. The use of AI in SLA should be thoroughly researched advancing the development of more intelligent AI packages, supporting interdisciplinary and integrative research, and ensuring ethical and responsible use. These efforts will offer language learners and educators maximal benefits and also minimize potential risks and challenges. If done mindfully, AI can become an invaluable tool for enhancing and supporting SLA.

5 Conclusions

In conclusion, AI packages for SLA are promising and beneficial for each learner and educator. However, in addition, they pose a few challenges that want to be addressed cautiously. As AI technology advances and turns into greater available and inexpensive, extra studies and traits are predicted to emerge in this area. On the other hand, teachers and learners should prepare the readiness in applying this type of technology in classroom to get the highest efficiency in second language learning and teaching.

6 Declarations

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6.2 Competing Interests

There are no conflicts of interest to disclose.

6.3 Study Limitations

Because of the limitation of document entry, the research database may lack of some the latest important research in AI and SLA fields. This limitation should be improved through conducting further research in the same topic when the researcher can access bigger and proper database.

6.4 Publisher's Note

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