Oke Oluwafemi Ayotunde
PhD, Academic Researcher, Department of Computer Information Systems,
Near East University, 99138 Nicosia, Cyprus via Mersin 10, Turkey
ORCID ID 0000-0001-9040-0531
oke.oluwafemi_a@yahoo.com

Dashty Ismil Jamil
PhD, Lecturer, Department of Biostatistics
Near East University, 99138 Nicosia, Cyprus via Mersin 10, Turkey
ORCID ID 0000-0002-2110-7611
20204582@std.neu.edu.tr

Nadire Cavus
PhD, Professor, Chairperson, Department of Computer Information Systems
Near East University, 99138 Nicosia, Cyprus via Mersin 10, Turkey
ORCID ID 0000-0001-7470-7752
nadire.cavus@neu.edu.tr

THE IMPACT OF ARTIFICIAL INTELLIGENCE IN FOREIGN LANGUAGE LEARNING USING LEARNING MANAGEMENT SYSTEMS: A SYSTEMATIC LITERATURE REVIEW

Abstract. Among numerous foreign languages, the English language is considered one of the major languages of the world. It has become a door opener for many people in their different fields and have led to advancements in career areas as it plays a major role in boosting confidence, improving connection, communication, and so on. It also gives people the opportunity for self-expression on a global standard level. Although the learning process of a foreign language can sometimes be difficult for both learners and teachers in terms of the various aspects of language learning, which includes; reading, writing, speaking, and listening skills. The methodology in this study implemented a systematic literature review using four popular scientific databases for searching relevant records for the purpose of the research. The results from searching the databases were integrated into the PRISMA flow diagram for the identification and extraction of high quality records that is relevant to the effects artificial intelligence has in the process of foreign language learning via the use of learning management system as the platform and medium for learning and teaching English as a foreign language. The systematic review research covers a span of 10 years, from 2011 to 2021. The most important finding in this systematic literature review is that the emergence of AI technology is helpful to both students and teachers in the learning of English as a foreign language using a learning management system as it improves and increases speaking, writing, reading, and listening skills processes and provides an easy, interesting, and personalized learning experience. The benefit of the study to shareholders; students and teachers, is to guide teachers on which AI tools to use and how they can be integrated or used into learning management systems to increase students' reading, writing, speaking, and listening skills in teaching and learning foreign languages, especially the English language.

Keywords: artificial intelligence; English language learning; AI tools; learning management systems; e-learning; foreign language learning.

1. INTRODUCTION

The world of technology has shaped the world massively in various sectors, with the educational sector not excluded. Technological tools and educational software have impacted learning and teaching by enhancing how the dissemination of knowledge takes place from teachers to students as well as between peers. Foreign language learning has become a key subject in recent times [1], as many have become bilingual, trilingual, and even polyglots from it, giving them the tenacity to speak, write, listen to, and read in those languages. One of the

main purposes of foreign language learning is to enable students of various levels to develop their communication competencies [2].

The general benefit of AI in students' learning processes includes personalization of lessons, remote lessons irrespective of location or device, quick responses from teachers and automated chatbots, and all-time access to learning materials for learning processes [2]. Benefits of AI for teachers in the teaching-learning process include ubiquitous teaching, personalization and easy access to course materials, effective and advanced answering through audio-visuals, and access to supportive materials online through automated task processes [3]. Therefore, it is necessary to take advantage of new emerging technologies to realize this goal. The studies in the literature show that AI benefits all stakeholders, especially with the use of new technologies like artificial intelligence tools [4]. This study explains the various tools and requirements for enabling the teaching and learning of foreign languages by teachers and students, respectively, via the use of artificial intelligence tools in learning management systems.

1.1. Artificial Intelligence in Education

Artificial intelligence, often known as AI or machine intelligence, is intelligence demonstrated by machines as opposed to the natural intelligence demonstrated by humans and other animals. Speech recognition, learning, planning, and problem-solving are just a few of the things it can perform [5]. Various AI algorithms and tools can be used for teaching or learning foreign languages. Hence, integrating AI into an LMS makes the learning platform smarter for learning a foreign language [6]. AI tools that can be integrated and used for teaching or learning foreign languages include natural language processing and speech and voice recognition systems, which include text-to-speech and speech-to-text. The integration of natural language processing AI tools allows LMS to have the features that make it able to read and understand human language [7] to improve speaking, writing, reading, and listening skills. NLP technologies parse and use algorithms to identify parts of complex human speech or language through syntax analysis [8]. Which in turn helps computers have extra abilities to read, understand, and interpret human language [9]. NLP has features for tasks such as the use of voice commands and chatbots, which can be used to provide feedback and answer questions [10]. Hence, it leads to an experience that is more user-friendly and intuitive for students.

[11] pointed out the impact of the voice recognition system and how it improves the speaking skills of students, thereby generating captions and transcriptions of the spoken words as text or written output. Leading to a better representation and learning experience. [12] emphasized how the speech recognition system has the capability of improving writing and speaking skills through the production of clear, readable, and large texts. [13] also pointed out that the voice recognition system provides a safe environment with no pressure during pronunciation and speaking practices for students. [14] explained how the speech recognition system has made the learning environment more friendly through the removal of writing barriers, thereby making previously unreachable courses now accessible to all learners. [15] stated improved productivity as the benefit of speech recognition, explaining that dictation of notes, responses, and some class activities can now be done by students without the need for the students to manually input, write, or type into a machine. Speech-to-text in speech recognition, according to [16], has the advantage of providing convenient ways for students to interact with a computer and their application software in the classroom environment. [17] described the use of voice and speech recognition as time-saving, accurate, and easy to use.

An aspect of education influenced by advancements in technology is foreign language learning [10]. A foreign language refers to an alien language. That is a language that is not of one's own origin or the language of another country or region. According to [18], learning

management systems are a richly featured platform for education that can be used in various fields. It is powered by web technologies. The use of learning management systems (LMS) has enhanced communication between teachers and students. And its integration with AI tools structures, for instance, text to speech, creates a teaching alternative for students during teachers' explanations by converting the teachers' spoken words to text. Thus, increasing the learning rate in the classroom environment [19]. Various LMS platforms exist, as do various aspects of artificial intelligence tools. There are many open-source AI tools available on the internet that easily integrate into LMSs without requiring any technical knowledge [20]. However, there exist missing gaps in scientific research on the aspect of teaching and/or learning a foreign language with learning management systems that use AI tools to help students and teachers improve foreign language skills like speaking, writing, listening, and reading. For this reason, this paper addresses the issues of explaining the artificial intelligence tools that can be integrated and used into learning management systems and that can be used to teach and/or learn a foreign language.

1.2. The Aim of the Study

This systematic literature review aims to identify the impact of artificial intelligence in foreign language learning using learning management systems by systematically reviewing studies related to the area. This study answers the following research questions after a systematic review and analysis:

RQ1: How was LMS used to teach and/or learn foreign languages?

RQ2: Does the use of AI tools in the LMS help develop the following foreign language skills?

- Speaking skills
- Writing skills
- Reading skills
- Listening skills

2. METHODOLOGY

A systematic literature review conducted in the study is based on a framework developed by Charles Sturt University, which describes clear steps like protocols and criteria that are stated and put first before a review process [21]. The developed framework is useful as it improves clarity, transparency, and strength of the research as well as reducing the likelihood of prejudice.

2.1. Search strategy

The search strategy adopted in this paper was influenced by the key terms in the study's topic, which are artificial intelligence, foreign languages, and learning management systems. These key terms were used as keywords, which in turn were the building blocks of the research paper study. The synonyms of the keywords were also put into consideration, as well as the logic. As shown in Table 1, the (("learning management system" or "LMS" OR "Moodle" OR "Blackboard" OR "Edmodo" OR "Docebo") AND (("foreign language" or "foreign language teaching" OR "foreign language learning" OR "English language") AND (("artificial intelligence" OR "natural language processing" OR "speech to text" OR "voice recognition system") query was used when searching from the ERIC, Scopus, ScienceDirect, and SpringerLink databases. The study included articles published over a 10-year span (2011–2021).

Table 1

Search query keywords

	Keyword	**Synonyms**
MAIN	"Artificial Intelligence"	"Natural language processing" OR "Speech to text" OR "voice recognition system"
AND	"Learning management system"	"LMS" OR "Moodle" OR "Blackboard" OR "Edmodo" OR "Docebo"
AND	"Foreign language"	"Foreign language teaching" OR "Foreign language learning" OR "English language"

2.2. Inclusion and Exclusion Criteria

This aspect does the sorting process to generate relevant studies within the scope of this study. The inclusion and exclusion criteria were important considerations in the process of selecting only relevant articles that fell within the scope of the study, as shown in Table 2. For a positive selection procedure, the inclusion criteria were carried out judiciously. For a paper to be included, it had to be in one of the four databases and written in the English language. These, among other inclusion criteria, Alternatively, papers that were excluded were those that did not meet the inclusion requirements.

Table 2

Inclusion and exclusion criteria

Inclusion Criteria	**Exclusion Criteria**
Articles published in English language were included.	Articles written in other language than English were excluded.
Primary studies, research articles, conferences, and books chapters that are relevant to the study were selected	Articles that did not answer or adequately define the research topic were excluded
Articles relevant to the research topics, keywords, and with open access were selected.	Articles out of context and non-correlating with our objectives were excluded.
Articles published within 2011-2021 range.	Articles before 2011 were excluded.

2.3. Selection Procedures

For a successful process of primary selection, a PRISMA diagram was implemented. Prisma is an acronym for Preferred Reporting Items for Systematic Literature Review and Meta-analysis [22]. A total of 695 (n=695) records were found in the databases during the 10-year period from 2011 to 2021, and they were as follows: ERIC (n=3), Scopus (n=19), ScienceDirect (n=12), and SpringerLink (n=661). Before the screening of the records, a 10-year limit was set, and a series of processes were taken on the records to ensure the exclusion of duplicates. A total of ninety-six (n = 96) duplicates were detected. Further to removing the duplicates, a total of five hundred and ninety-nine records (n = 599) were screened by the researchers based on their titles and abstracts. Then, the engagement in discussions of the selected articles for assessments, evaluation, and validation will determine if the articles can be included in the study. Further evaluation and assessments led to the exclusion of five hundred and sixty-two (n = 562) articles. These included articles not written in English (n = 45), articles that are not peer-reviewed (n = 215), articles that are not full access (requiring purchase or gold access) (n = 302). After that phase, the next phase was a full-text read and analysis of the eligible studies. Thirty-seven (n = 37) studies were accessed and checked for eligibility. Upon gathering eligible texts, a full-text read was carried out on the texts. Making the articles excluded after

full-text analysis twelve (n = 12). Hence, the total number of articles included in the review is twenty-five (n = 25) as shown in Figure 1.
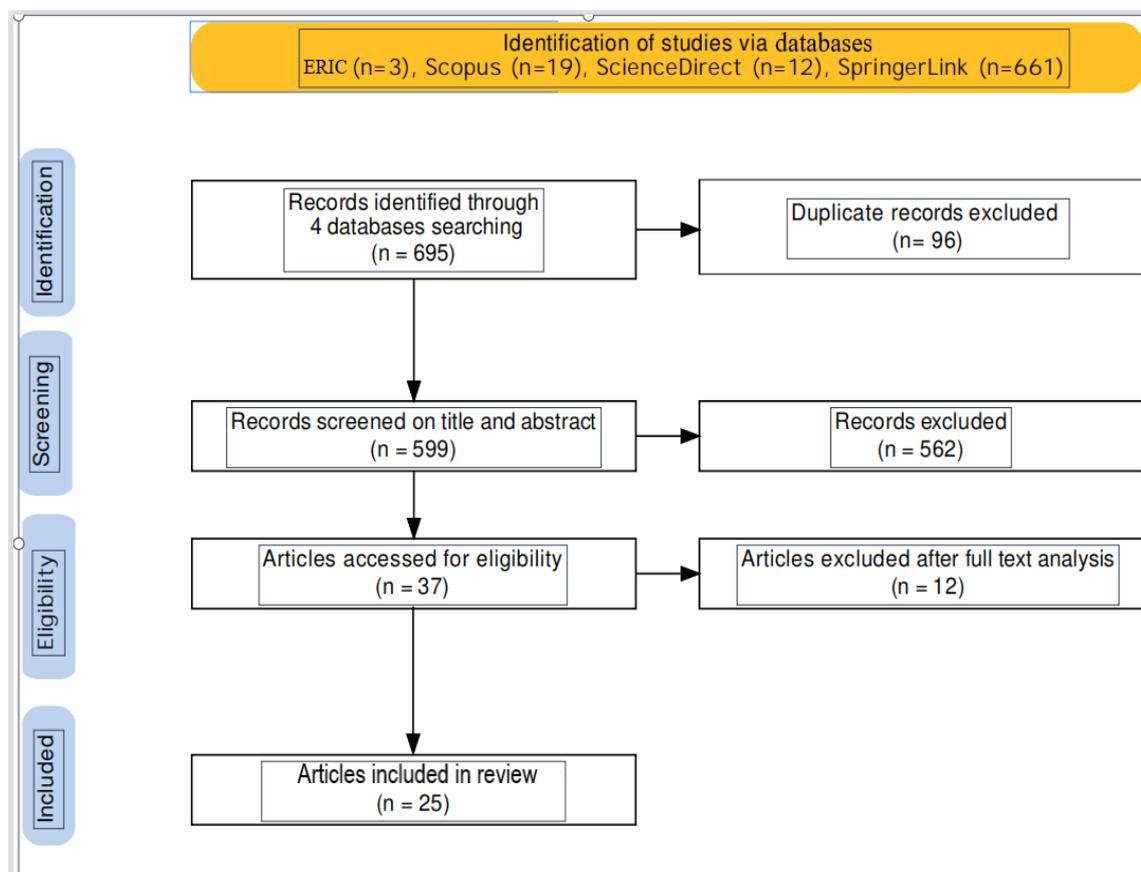

Figure 1: PRISMA flow diagram describing the selection process

In addition, more articles that documented twelve (n = 12) were excluded for justification reasons after having read the full article text. In the final selection process, a total of twenty-five (25) articles were considered good picks, having met all the inclusion criteria as well as aligning with the aim of this study.

2.4. Quality Assessment

The procedure of quality appraisal included in the selected papers was derived from having read the entire article of each paper and ascertaining they passed the inclusion criteria, which was part of the process of data extraction [23]. All review processes were closely monitored to maintain the quality of the selected papers, regardless of whether they were high-quality or standard papers. The qualities of the papers used in the study were carefully assessed by ensuring they answered the quality assessment questions and research questions in the systematic literature review.

2.5. Data Extraction

The researchers performed high-quality assessments of the articles, which included the data extraction process. Data extraction is a vital process as it helps get the most appropriate articles for the study [23]. For the data extraction, a list of features was developed to make the process a standard one, as well as a summary of the primary studies in the research (Table 3).

Table 3

Data extraction form

Data Item	Description
Author (year)	Name of authors present in the research and year
English	The foreign language focused on in the research
Teach/Learn	Mode of learning of the foreign language
AI Tools	The artificial intelligent tools used in the research
LMS	The learning management systems used by researchers
Read/write/speak/listen	The language learning aspect targeted by the researcher
Student/lecturer	Category of the research participant
Aim of the study	The purpose of the conducted research
Level of education (pry/higher)	The educational level of the student participant
The study country	Specific country of the researcher
Key findings	The breakdown of the entire research paper

2.6. Data Analysis

The data analysis was carried out after the data extraction from the retrieved articles. A data extraction summary was generated after conducting a descriptive synthesis. The data in the data extraction summary were analyzed using various factors based on artificial intelligence, foreign languages, and learning management systems to provide answers to the research questions.

3. RESULTS

3.1. Usage of LMS to Learn and Teach Foreign Languages

Each student's learning speed is different; some students can learn at once, while others need to repeat many times. Using AI tools in the LMS, the student can study the course materials multiple times until they deepen their understanding. This ensures that students can grasp the lessons and understand them without a teacher [9]. On the other hand, [24] explained how the vast majority of teachers (98 percent of the survey population) reported that they utilize learning software or applications to supplement their teaching practice. The most used learning management systems by educational management or school administration are such as E-kool, E-koolikott, Stuudium, Opiq, and the school's LMS. [12] stated that learning the English language with digital technology, such as learning management systems such as prototypes, enhanced quality education. Furthermore, with the increased potential to learn English as a foreign language due to AI tools such as Loquendo, quality is already recognized [12]. It is difficult to speak a foreign language naturally. Due to the student having little or no speaking time as a result of a shift in the way foreign language speakers are educated, smart tools are now being used. [11] stated that students' learning satisfaction and academic achievement increased after using the Conversation Learning System integrated with AI speech recognition technology, and it was also discovered that students developed self-encouragement and personal practice time for foreign language learning. According to [16], the use of a learning management system will allow the educator to use class time more effectively and focus the class on the most creative and advanced problems that require their guidance and cannot be performed by learners in a self-study mode. This improves the quality of education that university students receive and makes them more employable in the future [25]. The implementation of AI tools in a learning management system has a lot of possibilities for learning a foreign language. The advantages of using AI tools in the assessment of the 21st-

century learning process are that it makes it easier for teachers to evaluate academic outcomes [26]. Moreover, thanks to LMS and AI tools, we can give instant feedback to the student immediately after the quiz. This also gives the student the chance to see and correct their mistakes immediately [14].

3.2. The Use of AI Tools in LMS for the Development of Foreign Language Skills

To investigate which and how AI tools in LMS have been used to improve foreign language skills such as speaking, writing, reading, and listening.

3.2.1. For speaking skills

With regards to the speaking study by [11], they stated in a study conducted on primary students in Seoul, Korea, for two weeks to investigate the effect of using AI speech recognition technology (speech learning system) combined with a conversational learning system as LMS have influenced foreign language learning, especially in speaking skills. Also, [27] stated that some industrialized countries have established AI policy initiatives on numerous topics in education. Hence, leading to the implementation progress of using the new speech technologies in education. One of the most impressive benefits of this program is the merging of AI technology with exam orientation, which, as a result, improves speaking and writing skills and makes the technology available for English as a foreign language (EFL) learners [28]. Furthermore, according to the findings in the study, [15] explained how the English Liulishuo platform integrated with the computer-assisted language learning method can increase the efficacy of students' speaking and writing skills in learning the English language as a foreign language and can improve their IELTS performance and examination results by occasionally making inadvertent alterations to learners' speech, preventing them from providing untimely and inaccurate feedback. However, [12] generally stated the importance of the integration of artificial intelligence in LMS, asserting that it would improve students speaking skills. [29] pointed out how the incorporation of technology and e-learning platforms are key assets for self-study and learning skills such as speaking and writing in specific fields. [14] indicated in their study that they made use of a developed application for primary school students based on REST web services named "smart study" that integrated automated speech recognition (ASR) technologies, intelligent robot systems, and a framework utilized to support an English educational program. The result shows that students had more engagement with the app by allocating more time to study English, which in turn significantly enhanced their results after the evaluation of their quizzes. Additionally, [8] stated that digital innovation has paralleled the development of various foreign language teaching approaches in a positive and highly significant effort to adapt to the opportunities that society gives at all times. Furthermore, their findings indicated that learners who utilized blended learning settings learned more English than those who used face-to-face learning. [30] recommended that models of blended learning methods be integrated and used in the design of language teaching platforms. In addition, [26] and [31] demonstrated the use of intelligent tutoring systems and chatbots in learning management systems, respectively, and how they both supported the learning methods of LMS and provided numerous learning benefits that improved speaking skills in English language learning.

3.2.2. For writing skills

With regards to the writing skill, [13] and [9] stated that implementing artificial intelligence through platforms such as chatbots helps students at the university level learn the English language to improve their grammar and writing, such as research papers. In other

words, it develops students' independent work skills and their ability to work as a team, so it would benefit lecturers to implement them into the teaching process. [28] examined the challenges that students have when learning to write in a foreign language, from elementary school to university. The FEDCom model of EFL writing was integrated into learning platforms and implemented for students at all levels of education. Its main advantage is the collection of information from teachers on difficulties that students may encounter when learning English writing skills. [15] combined the speaking and writing skills of the English language using computer-assisted language learning (CALL) and integrated it into an English-learning app called Liulishuo to help students improve their IELTS scores. This will occasionally make inadvertent alterations to learners' writing, thereby providing them with real-time corrections as they write. [10] integrated AI Intelligent Computer-Assisted Language Learning (ICALL) in classroom management LMS, which creates a refined educational environment in which teachers can adjust writing skills teachings and student learning becomes flexible and adaptable, and management becomes more complete. [26] combined LMS with the Intelligent Tutoring System (ITS), which is based on machine learning and used to track, monitor, and supervise the all-around academic progress of students, including writing.

3.2.3. For reading skills

[24] integrated artificial intelligence in education (AIEd) in LMS to facilitate communications and collaborations among teaching and learning stakeholders. The outcome of this speaking is the production of strategies that help students learn the speaking process as it facilitates communication and collaboration. Also, [32] integrated an intelligent tutoring system in Moodle's learning management system to create an adaptive e-learning system to improve the reading skills of students. The enhanced system was capable of planning and authenticating the Moodle LMS through the tentative study for the cognition learning process of learning and improving reading skills. Furthermore, [33] used AI tools from social networking sites (SNS) in Moodle LMS. The integration of this interactive and collaborative social platform with an LMS served as a supplement to informal learning and speaking skills. Furthermore, [9] discussed the use, combination, and implementation of hybrid models, namely deep neural networks (DNNs) and the Natural Language Toolkit (NLTK), in natural language processing in artificial intelligence (NLP AI). This hybrid model enhanced the grammar reading of the English language as a foreign language in LMS. [34] integrated a support vector machine into an LMS to discover pedagogical characteristics that contributed to the high levels of accomplishment among ESL learners in their reading learning. This resulted in a considerable increase in the English reading skills proficiency of the students during the teaching. Even so, [24] focused on how the Intelligent Tutoring System (ITS) and big data in LMS can be used in research to improve reading skills in the English language as a foreign language in education and improve teacher-student engagement. On the other hand, [35] implemented Edmodo LMS for the development of learning English language skills and supported it by computing AI for reading skill development, which is an expert system that resulted in user settings flexibility as it allowed for a higher degree of visuals between schoolroom settings and users. This showed to offer intelligence- and behavior-based features for the LMS, thereby increasing the reading skills of learners.

3.3.4 For listening skills

In the area of listening skills, some studies focused on improving listening skills for students. In terms of studies that focused on how English language listening skills can be easily learned, [26] used an intelligent tutoring system (ITS) in a learning management system (LMS),

which is educational software containing an artificial intelligence component, to explain how the use of machine learning displays an optimistic outcome for the contemporary learning progress of students. Hence, the listening skills of the education module, the scholar module, and the interface module in the LMS benefit from the factitious intelligent area. On the other hand, [16] pointed out how learning management systems and the integration of speech recognition AI tools are used at the university level to teach the English language to high-level learners using NEO and Matrix LMS. The study further explains how the creation of courses that achieve discrimination in learning techniques through the use of a variety of learning methods results in courses that are more adaptable and cost-effective in terms of improving listening skills. Moreover, [17] study focused on the mobile experience of students in improving their listening skills in IELTS. This made use of mobile-assisted language learning (MALL) targeted at mobile platform devices. Its integration with Liulishuo, which is an artificial English-learning app that makes use of AI tools known as computer-assisted language learning (CALL), resulted in the online learning platform for international English study producing improved IELTS listening scores for students. Lastly, [35] focused on the Edmodo Learning Management System and the integration of intelligence-based AI tools that replicate the principles of human listening intelligence. The resultant effect of that is the provision of flexibility to instructional settings based on user needs and the provision of a higher degree of visual features between classroom settings and students, which increases listening skills and intelligence.

4. DISCUSSION

The systematic review implemented in this paper focuses on articles from reliable databases that were related to the study topic in order to identify the impact of artificial intelligence in foreign language learning using learning management systems by systematically reviewing studies related to the area. The results of this study answered the research questions by pointing out how foreign languages can be learned using LMS platforms and how the implementation and use of artificial intelligence can enhance the learning of foreign languages on the LMS platform.

The result of the importance of artificial intelligence in teaching is that the study found that AI tools are advantageous to teachers as they make it easier for a teacher to generate and set personalized questions for students based on the student's learning pace and levels [18]. Another advantage to the teachers is the automatic computation, grading, and evaluation of students' examinations and the automatic generation of their results by the learning system, with recommendations and visual representations such as graphs to show students' strengths and weaknesses after assessing their exams. Hence, this leads to reduced efforts and time for the teachers to prepare and focus on other courses [36]. An advantage to students in terms of learning is the various flexibilities offered to them [37]. There is the flexibility of personalization, in which a student can decide what he studies and how he chooses to study. Time flexibility is advantageous, as the student can decide when to study. Device flexibility gives the student the luxury to use a preferred device regardless of financial capacity [38]. Location flexibility is essential. Thanks to ubiquitous computing, students can learn from anywhere in the world with their preferred devices. In addition, the student has access to learning materials as well as reminders regarding completing an unfinished lesson [39].

In addition, in terms of the learning and dissemination of knowledge to students, this study also found that the number of published articles during the pandemic was over 50% higher than in previous years. Also, a large majority of researchers focused on learning English as a foreign language [16]. Implying that the pandemic might have had an impact on the rise of English as a foreign language. This is understandable, as the countries where research was carried out were non-English countries such as Spain, Greece, Portugal, and so on. Furthermore, the research result

on how LMS was used to teach foreign languages shows more studies are being carried out at the higher level of education. With some studies referring to primary school students as K–12 [40], the primary educational level students had low use and application of LMS and AI tools [41]. It is recommended that future research should focus on teaching and learning processes using AI tools and LMS for primary school students' level of education. This would help the primary school students and teachers get accustomed to how the platforms work and know which personalized combination of AI tools and LMS works best for them. That way, less work can be done on the students by the time they get to a higher level. However, the impact of artificial intelligence in the learning of foreign languages cannot be overlooked, as it has had a positive effect on both teaching and learning processes with a greater focus on student learning [20]. The use of AI tools in the LMS enhances the learning of English as a foreign language. Moodle LMS is the most preferred by the majority of researchers as it works well with integrating AI tools to improve speaking, writing, reading, and listening skills. Although, Edmodo LMS has also shown to be powerful as it accommodates the integration of AI tools like expert systems, according to [35]. However, this has its strength in the aspect of flexibility in setting learning and not really engaging or impacting learning directly, unlike Moodle LMS.

Generally, LMS enable teachers to efficiently create course materials, give lessons, access anytime and anywhere, and provide effective communication and collaboration between students. Also, assessing the performances of the students and providing adequate learning support resources have been made possible by the LMS. However, the integration of AI tools in LMS has further enhanced LMS for the various learning skills of foreign language learning. This significantly improved students learning in various skills. [42], [38], [35], and [43] all explained how AI tools effectively simulated a standard classroom experience for both students and teachers and aided the learning and development of foreign language skills in learners. The integration of machine learning models into the LMS enhanced the learning platform with extra features to improve language learning skills. This was used to assess and evaluate students' results automatically. Hence requiring less effort from the teachers, thereby making them able to use that spare time to prepare for other courses. Also, AI can be used to supervise and invigilate students during their exams.

English language learning skills have been greatly improved and developed as a result of the integration of AI tools into learning management systems (LMS). In the aspect of speaking, speech recognition technology, artificial speech synthesizers, intelligent CALL, automatic speech recognition, chatbots, and ITS have all shown to efficiently improve the speaking skills of English as a foreign language. In the aspect of writing, according to [13], some AI tools that work with speaking skills, such as chatbots, also work with writing. [15] and [17] explained how mobile platforms can be used to improve writing skills while preparing for IELTS. However, the Intelligent Tutoring System (ITS), according to [32], is the most efficient AI tool for writing. [32] combined ITS with Moodle LMS, which led to an adaptive system for writing skills development, with its implementation results showing a high outcome compared to its contemporaries. In the aspect of reading skills, [33] pointed out the impact that social networking sites have in acting as a teaching tool for students. This, however, can lead to distraction for the students. Hence, the alternative use of a Natural Language Toolkit (NLTK), according to [9], points out that a natural language processing (NLP) AI tool can handle the reading skills of students better as it works to improve learning cognitive techniques and automatically corrects grammatical errors. Furthermore, listening as an English language skill, according to [16], is improved by using speech recognition AI tools. However, that might have a downside based on the fact that speech recognition works better with speaking, according to [11]. That being said, [17] suggested the use of computer-assisted language learning (CALL) and its integration into a mobile-based platform called MALL, which stands for mobile-assisted language learning. But then, after a thorough review, the SLR shows that there's a model with

a more modern structural design that can be cross-platform rather than just mobile-based. [26] pointed out how the Intelligent Tutoring System (ITS) can produce optimistic results as a result of its machine learning intelligence for contemporary learning progression that shows support for various learning skills and platforms.

Amongst the 25 articles included in the study, the focus on the students had a high percentage. Six of the 25 studies, on the other hand, were solely focused on teachers. This showed that most researchers had their focus on students. Hence, a recommendation is for researchers to focus on teachers and the teaching of the English language as a foreign language in future studies. As this would help the teachers have a much better understanding of how AI tools can work well with LMS as they are the ones conducting the dissemination process to students of the language learning, Also, this would be helpful as the teachers could provide feedback on both the AI tools and LMS combination that, in their opinion, worked best and produced the best results [39]. Also, sensitization, awareness, workshops, and training for teachers on the know-how of LMS integration with AI tools are highly recommended. That way, teachers can integrate AI tools into their classes and platforms. This would increase the knowledge of the teachers on artificial intelligence and how it helps students learn foreign languages in learning management systems. As no research is perfect, there are limitations in this research that need to be addressed. The first had to do with the scope of the research, as it was limited to 10 years. Secondly, the research articles used in the research were written in the English language. Lastly, the articles used in the research were gotten from only four high-quality databases. Recommendations to future researchers include the use of a wider database search by sourcing articles from other high-quality scientific databases aside from the ones used in this study. Also, future researchers should consider the use of articles published in other languages aside from the English language. Finally, future studies in this area of research can be focused on developing and underdeveloped countries.

5. CONCLUSIONS

Over the past few years, the use of artificial intelligence and its integration in various sectors have been studied by researchers, with LMS getting more attention and popularity after the 2019 COVID-19 pandemic in education and various learning environments. The SLR found out that some research has been done on the use of artificial intelligence in LMS for foreign language learning, and the impacts of artificial intelligence in learning management systems for teaching and learning a foreign language were investigated. Therefore, for deeper knowledge of the subject matter, a systematic literature review has been conducted in this study. This covers existing literature on the use of artificial intelligence in foreign language learning in learning management systems. The results, therefore, described artificial intelligence that is suitable for the process of learning foreign languages as it provides an environment for conducive and self-paced learning, thereby making learning management systems interactive and more accessible. At the end of the SLR, it was found that in the literature, the most preferred LMS is Moodle, and the AI tools most suitable to be easily integrated with it are intelligent tutoring systems and speech recognition technology SRT. In conclusion, the SLR found that artificial intelligence usage in learning management systems increases learners' foreign language skills such as writing, reading, listening, and speaking, as well as their motivation and engagement in learning. It also revealed that a convenient self-paced learning platform can be created for students with the combination of these educational technologies. We hope that this SLR is written with the intent of being a guide for stakeholders such as teachers and educational administrators who are interested in integrating artificial intelligence into an LMS, specifically foreign language teaching.

On the other hand, there are various AI tools and LMSs, so in the future, it is recommended that researchers integrate more AI tools in LMSs to find out which are suitable and compatible to combine for teaching or learning foreign languages. Furthermore, teachers should be able to select which AI tool is more suitable for their needs. However, the SLR found that there is a need for more studies focused on the teacher's perspective, as the majority of the research in this study solely focused on the language learning process to improve students' learning skills.

REFERENCES (TRANSLATED AND TRANSLITERATED)

[1] C. Covacevich, J. Vargas, N. Viltard, A. Schleicher, Y. Belfali, M. Ikeda, T. Halgreen, A. Mann, F. Avvisati, G. Marconi, G. Rech, R. Castaneda, A. Burke, S. Copeland, and T. Marwood. "How language learning opens doors." OECD.org. [Online]. Available: https://www.oecd.org/pisa/foreign-language/opens-doors.pdf (accessed Oct. 12, 2022).

[2] S. Maghsudi et al., "Personalized Education in the Artificial Intelligence Era: What to Expect Next," *IEEE Xplore,* vol. 38, no. 3, p. 14, 2021, doi: 10.1109/MSP.2021.3055032.

[3] Y. M. Huang et al., "The design and implementation of a meaningful learning-based evaluation method for ubiquitous learning," *Comput Educ,* vol. 54, no. 4, p. 12, 2011, doi: https://doi.org/10.1016/j.compedu.2011.05.023.

[4] A. Alam, "Should Robots Replace Teachers? Mobilisation of AI and Learning Analytics in Education," in *ICAC3N*, Mumbai, India, 2021, doi: 10.1109/ICAC353642.2021.9697300.

[5] M. Ziyad Saleh, "Artificial Intelligence Definition, Ethics and Standards," *BUE,* p. 13, April 2019. [Online]. Available: https://www.researchgate.net/publication/332548325_Artificial_Intelligence_Definition_Ethics_and_Standards

[6] W. Villegas-Ch, M. Román-Cañizares, and X. Palacios-Pacheco, "Improvement of an Online Education Model with the Integration of Machine Learning and Data Analysis in an LMS," *Appl. Sci.,* vol. 10, no. 15, p. 18, 2020, doi: https://doi.org/10.3390/app10155371.

[7] K. M. Alhawiti, "Natural Language Processing and its Use in Education," *Int J Adv Comput Sci Appl.,* vol. 5, no. 12, pp. 72-76, 2014. [Online]. Available: https://thesai.org/Downloads/Volume5No12/Paper_10-Natural_Language_Processing.pdf

[8] K. A. Livingstone, "The Importance of Feedback and Reinforcement in Computer-Assisted Language Learning (CALL)," *BIRJ,* vol. 2, no. 1, pp. 43-51, 2012. [Online]. Available: https://www.researchgate.net/publication/259844211_The_importance_of_feedback_and_reinforcement_in_Computer_Assisted_Language_Learning

[9] J. J. Enriquez, "Natural language processing in artificial intelligence (NLP AI) and natural language processing algorithms relating to grammar as a foreign language," *UPV,* vol. 7, no. 3, pp. 1-24, 2018. [Online]. Available: https://www.researchgate.net/publication/328268746

[10] S. Pokrivcakova, "Preparing teachers for the application of AI-powered technologies in foreign language education," *Sciendo,* vol. 7, no. 3, p. 19, 2019, doi: https://doi.org/10.2478/jolace-2019-0025.

[11] Y. Lee and J. Cho, "Design of a Foreign Language Conversation Learning System Using Machine Learning," *Int. J. Innov. Creativity Chang.,* vol. 13, no. 4, pp. 235-247, 2020. [Online]. Available: https://ww.ijicc.net/images/vol_13/Iss_4/13426_Lee_2020_E_R.pdf

[12] J. P. Lousado et al., "Audio folios management system for foreign language learning," in *CISTI 2011*, Chaves, Portugal, 2011. [Online]. Available: https://ieeexplore.ieee.org/abstract/document/8451886

[13] M. Petrova and M. Khalil, "Artificial intelligence in adaptive teaching a foreign language," in *PFUR* , Moscow, Russia, 2020, doi: 10.22363/09835-2020-294-304.

[14] J. Zheng et al., "Cognition-based context-aware cloud computing for intelligent ro botic systems in mobile education," *IEEE Access,* vol. 6, pp. 49103-49111, 2018, doi: 10.1109/ACCESS.2018.2867880.

[15] X. Li, "The Effectiveness of Mobile-assisted Language Learning (MALL) Applications on the Spoken English Assessments in China's Universities," in *SDMC 2021*, South Australia, Australia, 2020. [Online]. Available: https://doi.org/10.2991/assehr.k.220105.137.

[16] S. Tumskiy, "The Use of Learning Management Systems in the Teaching of English to High-Level Learners at Tertiary Level," in *INTED 2019*, Valencia, Spain, 2019, doi: 10.21125/inted.2019.0915.

[17] L. Ruolin, "Using Artificial Intelligence in Learning English as a Foreign Language: An Examination of IELTS LIULISHUO as an Online Platform," in *Innov. Lang.*, Northeast Normal University, China, 2020. [Online]. Available: https://conference.pixel-online.net/files/ict4ll/ed0013/FP/6952-ICT4876-FP-ICT4LL13.pdf

[18] P. Wulandari and C. W. Budiyanto, "Improving Foreign Language Learning by the Mean of Learning Management System: Review of the Literature," *ASSEHR,* p. 16, 2017, doi: 10.2991/ictte-17.2017.67.

[19] H. Jamal and A. Shanaah, "The Role of Learning Management Systems in Educational Environments: An Exploratory Case Study," *LAP*, 2012, Art. No. 3848418738, doi: 10.5555/2341181.

[20] V. Kavitha and R. Lohani, "A critical study on the use of artificial intelligence, e-Learning technology and tools to enhance the learners experience," *Cluster Comput,* vol. 3, pp. 6985-6989, 2019, doi: https://doi.org/10.1007/s10586-018-2017-2.

[21] Charles Sturt University. "Literature Review: Systematic literature reviews." LIBGUIDES.csu.edu.au. [Online]. Available: https://libguides.csu.edu.au/review/Systematic#:~:text=A%20systematic%20literature%20review%20(SLR,before%20the%20review%20is%20conducted (accessed Nov. 21, 2021).

[22] PRISMA. "Welcome to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses." PRISMA.com. [Online]. Available:http://www.prisma-statement.org/ (accessed Dec. 8, 2022).

[23] University of Canberra. "Systematic Reviews in Health." CANBERRA.LIBGUIDES.com. [Online]. Available:https://canberra.libguides.com/systematic/appraise (accessed June 14, 2022).

[24] X. Zhang, "The Application Research of Artificial Intelligence and Big Data Analysis Technology in University Foreign Language Teaching," in *JPCS*, Shanghai, China, 2020, doi: doi:10.1088/1742-6596/1684/1/012022.

[25] G. Kessler, "Technology and the future of language teaching," *FLA,* vol. 51, no. 1, pp. 205-218, 2018, doi: https://doi.org/10.1111/flan.12318.

[26] Herbert et al., "Learning Management System (LMS) model based on machine learning supports 21st century learning as the implementation of curriculum 2013," in *JPCS*, Bandung, Indonesia, 2019, doi:10.1088/1742-6596/1280/3/032032.

[27] X. Gong et al., "AI Educational System for Primary and Secondary Schools.," in *ASEE 2019*, Tampa, Florida, 2019, doi: 10.18260/1-2—32050.

[28] A. Eryılmaz and Y. E. Yeşilyurt, "Foreign Language Writing as a Developmental Process (Foundation, Expansion, Development, and Completion): The FEDCom Model," *Int. J. Contemp. Educ.,* vol. 2, no. 1, p. 30, 2020, doi: https://doi.org/10.33200/ijcer.768768.

[29] S. Britain, "On the Relationship Between Pedagogical Design and Content Management in eLearning," *LCMS,* pp. 55-69, 2011, doi: 10.1007/978-1-4419-6959-0_4.

[30] R. S. Morales and C. A. Ferreira, "The effectiveness of a blended learning model for teaching English as a foreign language: an empirical study," *RLA, Rev. de linguistica Teor. y Apl.,* vol. 46, no. 2, pp. 95-118., 2008, doi: http://dx.doi.org/10.4067/S0718-48832008000200006.

[31] L. K. Fryer et al., "Stimulating and sustaining interest in a language course: An experimental comparison of Chatbot and Human task partners," *CHB,* vol. 75, pp. 461-468, 2017, doi: https://doi.org/10.1016/j.chb.2017.05.045.

[32] V. Bradac and B. Walek, "A Comprehensive Adaptive System for E-learning of Foreign Languages," *Expert Syst. Appl.,* vol. 90, 2017, doi: 10.1016/j.eswa.2017.08.019.

[33] E. Dogoriti, J. Pange, and G. Anderson, "The use of social networking and learning management systems in English language teaching in higher education," *CWIS,* vol. 34, no. 10, pp. 1-10, 2014, doi: http://dx.doi.org/10.1108/CWIS-11-2013-0062.

[34] Y. Xiao and J. Hu, "Assessment of Optimal Pedagogical Factors for Canadian ESL Learners' Reading Literacy Through Artificial Intelligence Algorithms," *Int. J. Engl. Linguist.,* vol. 9, no. 4, pp. 1-14, 2019, doi: http://dx.doi.org/10.5539/ijel.v9n4p1.

[35] N. S. Aldahwan and N. I. Alsaeed, "Use of Artificial Intelligent in Learning Management System (LMS): A Systematic Literature Review," *Int. J. Comput. Appl.,* vol. 175, no. 13, p. 12, 2020, doi: https://doi.org/10.5120/ijca2020920611.

[36] [36]   D. Fotini, "Developing reading in modern foreign languages: Case studies from the classroom," *JALT,* vol. 2, no. 1, p. 7, 2019, doi: https://doi.org/10.37074/jalt.2019.2.s1.5.

[37] M. Anoopkumar and R. Zubair, "A Review on Data Mining techniques and factors used in Educational Data Mining to predict student amelioration," in *SAPIENCE*, Ernakulam, India, 2016.

[38] D. Burgos, "Background Similarities as a Way to Predict Students' Behaviour," *Sustain Sci,* vol. 11, no. 24, p. 13, 2019, doi: 10.1109/SAPIENCE.2016.7684113.

[39] D. Yasemin, "Students' Views on Language Skills in Foreign Language Teaching," *Int. Educ. Stud.,* vol. 11, no. 7, pp. 166-178, 2018, doi: 10.5539/ies.v11n7p166.

[40] I. Chounta, E. Bardone, A. Raudsep, and M. Pedaste, "Exploring Teachers' Perceptions of Artificial Intelligence as a Tool to Support their Practice in Estonian K-12 Education," *IJAIED,* vol. 32, no. 2, pp. 1-31, 2021, doi: http://dx.doi.org/10.1007/s40593-021-00243-5.

[41] H. Bozorgian and H. Pillay, "Enhancing Foreign Language Learning through Listening Strategies Delivered in L1: An Experimental Study," *Int. J. Instr.,* vol. 6, no. 1, pp. 105-122, 2013. [Online]. Available: https://files.eric.ed.gov/fulltext/ED539838.pdf

[42] C. Romero and S. Ventura, "Educational data mining and learning analytics: An updated survey," *KDD,* vol. 10, no. 3, p. 21, 2020, doi: https://doi.org/10.1002/widm.1355.

[43] S. Ayesha, M. K. Hanif, and Ramzan Talib, "Overview and comparative study of dimensionality reduction techniques for high dimensional data," *Inf Fusion,* vol. 59, pp. 44-58, 2020, doi: https://doi.org/10.1016/j.inffus.2020.01.005.

ВПЛИВ ШТУЧНОГО ІНТЕЛЕКТУ НА ОПАНУВАННЯ ІНОЗЕМНИХ МОВ З ВИКОРИСТАННЯМ СИСТЕМ УПРАВЛІННЯ НАВЧАННЯМ: СИСТЕМАТИЧНИЙ ОГЛЯД ЛІТЕРАТУРИ

Оке Олувафемі Айотунде
PhD, науковий співробітник, Кафедра комп'ютерних інформаційних систем
Близькосхідний університет, Нікосія, Кіпр - Мерсін, Туреччина
ORCID 0000-0001-9040-0531
oke.oluwafemi_a@yahoo.com

Дашти Ісміль Джаміль
PhD, викладач, Кафедра біостатистики
Близькосхідний університет, Нікосія, Кіпр - Мерсін, Туреччина
ORCID 0000-0002-2110-7611
20204582@std.neu.edu.tr

Надір Кавус
PhD, професор, завідувач кафедри, Кафедра комп'ютерних інформаційних систем
Близькосхідний університет, Нікосія, Кіпр-Мерсін, Туреччина
ORCID 0000-0001-7470-7752
nadire.cavus@neu.edu.tr

Анотація. Серед багатьох іноземних мов англійська мова вважається однією з основних мов світу. Вона відчиняє двері різних галузей для багатьох людей і допомагає їх кар'єрному зростанню в різних сферах, оскільки відіграє важливу роль у підвищенні впевненості під час спілкування і налагодження зв'язків тощо. Крім цього, спілкування англійською мовою дає можливість самовираження на рівні світових стандартів. Однак процес вивчення іноземної мови іноді може бути важким як для тих, хто навчається, так і для викладачів з точки зору різних аспектів вивчення мови, а саме: навичок читання, письма, говоріння та аудіювання. Методологія цього дослідження базувалась на систематичному огляді літератури з використанням чотирьох науково-популярних баз даних, які відповідали цілям дослідження. Результати пошуку в базах даних були інтегровані в блок-схему PRISMA для ідентифікації та вилучення високоякісних записів, які стосуються впливу штучного інтелекту на процес вивчення іноземної мови за допомогою використання системи управління навчанням як платформи та середовища для вивчення і викладання англійської мови як іноземної. Систематичне оглядове дослідження охоплює 10 років, з 2011 по 2021 роки. Найважливіший висновок у цьому систематичному огляді літератури полягає в тому, що поява технології штучного інтелекту (ШІ) допомагає як учням, так і викладачам у вивченні англійської мови як іноземної за допомогою системи управління навчанням, оскільки вона покращує формування навичок говоріння, письма, читання та аудіювання, а також забезпечує достатньо легкий, цікавий та персоналізований досвід навчання. Користь проведеного дослідження для учасників навчального процесу полягає в тому, щоб допомогти викладачам визначитись, які інструменти штучного інтелекту краще використовувати, як їх можна інтегрувати в систему управління навчанням з метою покращення навичок читання, письма, говоріння та аудіювання учнів під час викладання та вивчення іноземних мов, особливо англійської мови.

Ключові слова: штучний інтелект; вивчення англійської мови; інструменти ШІ; системи управління навчанням; електронне навчання; вивчення іноземної мови.