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Öğr. Gör. Adem Demir
https://orcid.org/0000-0001-9915-295X
Sivas Cumhuriyet Üniversitesi, Rektörlük, Sivas / TÜRKİYE
ROR Id: https://ror.org/04f81fm77

Artificial Intelligence and English Language Teaching: Review of the Research Articles from 2016 to 2020

Yapay Zeka ve İngilizce Dil Öğretimi: 2016-2020 Araştırma Makalelerinin İncelemesi

ABSTRACT

The aim of this chapter is to review some of the most relevant research on the use of Artificial Intelligence (AI) in English language teaching published between 2016 and 2020. The literature review encompasses studies scanned through the ERIC, EBSCO, Google Scholar, Science Direct, and Scopus databases. Nineteen studies have been examined and information including the study context, methodology preferred, research goals and themes, and results are briefly summarized. Additionally, the chapter seeks to highlight key advancements and emerging trends in AI-enhanced language learning tools, such as adaptive learning platforms, intelligent tutoring systems, and natural language processing applications. Further, based on the analysis of the articles, three categories of topics of research have been identified: (a) studies on contributions of AI to the effectiveness of learning English; (b) studies on development of EFL teachers' awareness and proficiency for using AI in teaching English; and (c) studies focused on forms of AI applications in foreign language education. Moreover, the challenges and limitations in adopting AI tools in diverse educational settings, including issues of accessibility, teacher training, and ethical considerations, are also addressed. As a result, it is hoped that this principled review provides researchers with insights into understanding the place of AI in foreign language teaching and offers useful information regarding the most recent research trends and practical implications in their area of research.

Keywords: Artificial Intelligence, EFL, Database

ÖZET

Bu bölümün amacı, 2016 ve 2020 yılları arasında İngilizce dil öğretiminde Yapay Zeka (AI) kullanımına ilişkin en ilgili araştırmalardan bazılarını gözden geçirmektir. Literatür taraması, ERIC, EBSCO, Google Scholar, Science Direct ve Scopus veri tabanları üzerinden taranan çalışmaları kapsamaktadır. On dokuz çalışma incelenmiş ve çalışma bağlamı, tercih edilen metodoloji, araştırma hedefleri ve temalar ile sonuçlar gibi bilgiler kısaca özetlenmiştir. Ayrıca, bölüm, uyarlanabilir öğrenme platformları, akıllı öğretim sistemleri ve doğal dil işleme uygulamaları gibi AI destekli dil öğrenme araçlarında önemli ilerlemeleri ve yeni eğilimleri vurgulamayı amaçlamaktadır. Yapılan makale analizine dayanarak, üç ana araştırma konu kategorisi belirlenmiştir: (a) AI'nin İngilizce öğrenme etkinliğine katkılarına ilişkin çalışmalar; (b) İngilizce öğretiminde AI kullanımı için yabancı dil olarak İngilizce (EFL) öğretmenlerinin farkındalık ve yetkinlik gelişimine odaklanan çalışmalar; ve (c) yabancı dil eğitiminde AI uygulama türlerine odaklanan çalışmalar. Ayrıca, AI araçlarının çeşitli eğitim ortamlarında benimsenmesindeki erişilebilirlik, öğretmen eğitimi ve etik konular gibi zorluklar ve sınırlamalar da ele alınmaktadır. Sonuç olarak, bu ilkeli derlemenin, araştırmacılara AI'nin yabancı dil öğretimindeki yerini anlamada fikir vermesi ve kendi araştırma alanlarında en güncel araştırma eğilimleri ile pratik uygulamalar hakkında yararlı bilgiler sunması umulmaktadır.

Anahtar Kelimeler: Yapay Zeka, EFL, Veritabanı

1. INTRODUCTION

Information technology (IT) plays a salient role in contributing to the quality of learning and teaching a foreign language by fostering the motivation of learners, changing the instructional design and facilitating the teaching and learning language skills and components. Education policies and curriculum of many EFL programs have been recently included different teaching and learning opportunities through virtual learning (Syaifullah, & Herdi, 2018). One of the most prominent of those opportunities is artificial intelligence which has an enormous effect in the pedagogical aspects of foreign teaching (Haristiani, 2019).

Artificial Intelligence (AI) is an interdisciplinary research area concerned with designing machines which can emulate tasks that are performed by intelligent beings. The term itself was firstly used by John McCarthy in 1956. AI is generally designed for providing practitioners with virtual assistance in facilitating human tasks (Russell & Norvig, 2016). In an educational setting, AI helps both learners and teachers by acting as an important tool for promoting teaching and learning process (Pokrivcakova, 2019). They can easily reach to the course content, activities and educational games at any time through the technological devices supported by AI software (Hamuddin, 2016). This type of learning helps learners to practice language skills, fosters learner motivation, and expands the horizon of the stakeholders about the digitalization of the world in the 21st century.

Many studies reveal that the use of AI Technologies in EFL settings support language learning by increasing learners' desire to participate in the learning activities and their motivation by decreasing their stress level as a result of using the target language with machines (Cao, 2019). Furthermore, artificial intelligence has contributed to the integration of information technology into curriculum and planning of the teaching instruction by bringing creativity and interactivity to the field of foreign language teaching (Zou, 2017). The foreign language learning platforms that are supported by AI technology help learners to make progress at their own pace, reviewing content, and exercising the issues they have difficulty in grasping as well as allowing them to deal with the tasks they are interested in (Liao, 2016). Thanks to those platforms, teachers can predict the learners' learning styles, preferences, language learning strategies they use to learn language and modify their instruction according to the data obtained as a result of teacher observation.

Another striking feature of AI-powered activities is providing immediate feedback to learners (Mukhallafi, 2020). The language tests of learners can be easily graded by AI-supported tools and even writing tasks can be evaluated by pointing out the errors and offering alternative solutions automatically within a short period of time (Underwood, 2017). This type of feedback helps learners to correct their mistakes and get better results on forthcoming tasks. When the quality of teaching is concerned, AI helps teachers to realize the weaknesses in their practice and adapt practical applications or assignments to achieve program goals more efficiently (Wang, 2019).

The aim of this article is to provide a critical review of existing studies which a focus of investigating AI uses in EFL teaching and learning from the most prominent journal databases. In the current study, the articles that has been written in the last five years, this principled review, hence, aims at providing a specific and up-to-date examination of what has been done in that regard recently.

2. METHODOLOGY

The researcher followed some specific procedures for the publication selection process to reveal the present status and lines of research regarding the use of artificial intelligence in EFL learning and teaching.

2.1 Research Design

In the present study, qualitative research design; more specifically content analysis is employed. Content analysis is used as a research tool to detect the presence of specific concepts within texts. Researchers categorize and analyze the occurrence, meanings and relationships of the concepts, then make judgments about the text which can be identified as books, book chapters, interviews, essays, newspaper headlines and articles, speeches, conversations, advertising or even informal conversation. The review of articles in the current research is derived from research articles as the researcher has synthesized related information relevant analyzing these resources to achieve the goal of the study.

2.2. Sampling of Research Articles

The research articles which were searched with the aim of reviewing the uses of AI in EFL teaching and learning of English are obtained from databases – ERIC, EBSCO, Google Scholar, Science Direct and

Scopus. The reliability of those databases is higher than the search engines and they are considered to be as the major eligibility criteria. Further, only the articles which have been published in the last 6 years have been selected as samples of articles for the current paper. Most of the articles were issued in multidisciplinary journals such as Journal of Physics, International Journal of Artificial Intelligence and Journal of Advanced Science and Technology.

2.3. Data Collection Procedures

Data collection began with determining a comprehensive list of key terms related to principal theme to find out relevant studies. In the first step of the data collection procedures, the appropriate databases, digital libraries, search engines and journals were searched or the key words "artificial intelligence + language learning and teaching + AI, EFL and ESL" by the researcher. The search yielded 20 articles from databases and different journals as can be seen in Table 1 and Table 2.

Table 1. List of Databases and Journal Indexes on AI Between 2017-2022

Index	Science Direct	GOOGLE SCHOLAR	ERIC	SCOPUS	EBSCO	N
Journals	7	5	6	9	8	15
Articles	8	6	6	11	9	19

Table 2. List of Journals Published Studies on AI Between 2017-2022

Journal	Studies
Language Awareness	1
International Journal of Advanced Science and Technology	1
Advances in Engineering Education	1
Journal of Language and Cultural Education	1
International Journal of Artificial Intelligence	1
The New Educational Review	1
Journal of Computational and Theoretical Nanoscience	1
Journal of Intelligent and Fuzzy Systems	1
International Journal of Information and Communication Technology Education	1
EuroCALL	1
Advances in Social Science, Education and Humanities Search	1
Arab World English Journal	1
Journal of Physics	1
Journal of Critical Reviews	1
International Journal of Scientific and Technology Research	1
Journal of Material Sciences and Engineering	1
Journal of Human Sciences	1
International Journal of English Linguistics	1
International Journal of Conceptions on Computing and Information Technology	1

Secondly, articles that were directly related to the use of AI in language learning and teaching were selected.

Table 3. Topics and Contexts in AI Research

Source	Type of the study	Focus	Context
Al Mukhallafi, T. R. (2020)	Analytical	Strategies for applying (AI) applications to teach/learn English	44 Students from Northern Border University (Saudi Arabia)
Junaidi et all. (2020)	Quasi-experimental	Rising Students' Speaking Performance with Lyra Virtual Assistance	64 7th grade learners (Indonesia)
Benhadj, Y., El Messaoudi, Nfissi, A. (2019)	A Case Study	Integrating Gaming Classroom Management	41 EFL High School Learners (Morocco)
Tsai, C. (2019	Experimental	Using Robots to Enhance EFL Performance	53 3rd grade EFL Learners (Taiwan)
Underwood, J. (2017)	The 'in the wild' design	AI language assistants with Young Learners	11 primary-age EFL Students (Spain)
Keezhatta, M (2019)	State of the art	NLP platforms and AI Applications,	Relevant Articles
Wang, R (2019)	State of the art	Artificial Intelligence for Promoting EFL	Relevant Articles
Haristiani, N. (2019)	Descriptive method	Chatbots as Language Learning Medium	Relevant Articles
Cao, M. (2019)	Mixed method	AI and College EFL Learning	69 EFL Learners in Peihua University (China)
Liao, H. (2016)	Mixed Method	Using AWE-assisted Tool for Writing Performance	63 EFL students in different Universities (China)
Pikhart, M. (2020)	State of Art	The Use of AI in Language Learning Apps	Relevant Articles

Pokrivcakova, S. (2019)	State of Art	Preparing teachers for AI-powered technologies EFL	Relevant Articles
Almutairi, A. et all (2020)	State of Art	Conceptual AI framework to Improving EFL Learning	Relevant Articles
Zou, S. (2017)	State of Art	Designing a College EFL Teaching Platform Based on Artificial Intelligence	Relevant Articles
Bin, Y., Mandal, D. (2019)	State of Art	English Teaching Practice Based on Artificial Intelligence Technology	Relevant Articles
Zuraina, A. (2020)	Article Review	A Review of AI in EFL	Relevant Articles
Canbek, N., Mutlu, M. (2016)	State of Art	Learning with Intelligent Personal Assistants	Relevant Articles
Xiao, Y., Hu, J. (2019)	Experimental	Reading Literacy Through Artificial Intelligence Algorithms	203 EFL learner Learners (Canada)
Keerthiwansha, S. (2018)	Quantitative	AI and ESL Learning	23 Lecturers in University of Kelaniya (Sri Lanka)

In the following step, the articles were read and analyzed to get the core of the contents. In the last step, themes were defined to clarify and make connections between the research findings.

2.4. Data Analysis Procedures

In the first step, the researcher employed skimming, scanning, analyzing and synthesizing strategies to read the contents of the selected articles. Then, the researcher searched for the link between the articles and themes that were mostly used in those articles. In addition, the researcher summarized to elicit the significant and relevant findings.

3. RESEARCH FINDINGS

This article review aims at finding out the use of artificial intelligence for the purpose of enhancing the quality of foreign language learning/teaching and facilitating this learning and teaching process. As a result of the analysis of the selected articles regarding the aforementioned issue, three themes have been identified.

3.1. The Contributions of AI to the Effectiveness of Learning English

In the articles reviewed for the sake of revealing the role of AI in EFL teaching and learning, it was revealed that AI-based language tools have an important impact on the development of overall language learning and teaching quality. AI helps teachers to carry out several classroom activities, especially translation tasks.

3.1.1. Speaking and AI Use

In two of the studies, it was reported that AI facilitated the learners' participation in speaking activities without feeling stress or embarrassment and speaking to AI-supported tools was regarded as an effective way of oral practicing. Learners were observed to be willing to speak more the target language when engaging with AI tools both individual and group works. Additionally, the immediate feedback provided by those tools helped learners to revise and correct their mistakes spontaneously and maintained their participation by insisting on making the tools do their commands and reply to their questions.

3.1.2. Writing and AI Use

One article was conducted to examine 63 participants' writing performance through revision of the articles and assignment of new essays, inquiring perceptions and learning strategies in an AWE-supported process-writing program. The results of the questionnaires and essays regarding learner perceptions showed that contributed to the grammatical accuracy of their writing and development in the writing proficiency. As a result of semi-structured interviews, it was found that AWE-assisted writing fostered metacognitive strategy use and facilitated language modification and learners' initial writing ability.

3.1.3. Listening and AI Use

According to the article selection criteria, one study that was relevant to teaching listening skill in EFL settings was found and analyzed. After the data collection process and analysis, Suryana, Asrianto & Murwantono (2020) concluded that artificial intelligence-based mobile tools can help learners to improve their English listening skills. In the study, the learners were provided with different platforms including Tune In, Joox Music, VOA Learning English and Netflix to make practice on listening activities. The

findings of the study showed that the most proficient AI mobile application to develop listening skills was Netflix.

3.1.4. Reading and AI Use

In ESL reading teaching, AI-powered reading activities which are compatible with students' interests was reported to be particularly effective in fostering successful EFL readers in primary school, which was relevant with previous studies that showed the positive effects of artificial intelligence-based materials on EFL reading comprehension (Xiao & Hu, 201p). The personalization of the reading materials through AI was the main reason for the development of EFL reading comprehension. The learners were intrinsically motivated and involved in the classroom activities due to the personally chosen materials. Besides, it was revealed that the motivated learners were able to decode the conceptual context of a text and exploit the meaning of the text easily (Xiao & Hu, 2019).

3.2. Increasing EFL teachers' Awareness and Proficiency for Using AI in Teaching English

Three of the articles were found to be relevant for this category and the findings of them were summarized under this title conjunctly. It was noted in those studies that AI helped teachers to present more detailed descriptions of target language, integrate well-designed corpora as well as providing them a deeper understanding of cognitive and behavioral psychology of learners. Further, AI-powered teaching contributes to the learning environment, which is more personalized, inclusive, sophisticated and flexible in comparison with the traditional ones. AI-powered tools can analyze several learner outputs, identify the learners' individual learning needs and provide learners with immediate and well-grounded feedback in a very short period. Thus, these tools and applications help teachers to carry out tiring, effort, and time-consuming tasks easier and provide learners with a source of motivation and inspiration.

In many countries in which English is taught as a foreign language, learners have limited opportunity to reach enough exposure to target language and use that language in real life conditions. AI provides an interactive learning environment for learning English learning. Learners are encouraged to communicate with AI-powered machines which help teachers to increases the authenticity of the language environment and functionality of the instruction by providing learners with error correction in almost all types of activities within a relaxed and pleasant atmosphere.

Finally, AI-powered applications help teachers to produce smart and interactive teaching content in and outside the classroom. With the help of those applications, teachers can create digital textbooks, lesson plans or materials which may be regarded as more engaging by learners. The content of the language teaching materials can also be visualized and powered by simulations thanks to AI technologies. Besides, AI helps teachers to update the content of the lessons and modify the content for different teachings activities.

3.3. Forms of AI Applications in Foreign Language Education

In the articles reviewed for the current study, several applications were utilized to improve teaching and learning language skills and components. Machine translation (MT) is one of those applications which refer to the use of software to employ translation of texts from one language to another. Artificial intelligence may contribute to the development of the quality of machine translation considerably though many teachers tend to consider MT as useless or disruptive. It is also stated that EFL teachers should benefit from MT possibilities and provide learners with enough guidance for learners bearing in mind the limitations of the tool in language learning context.

AI writing assistants are among the tools that have been employed in two studies. The tool helps learners to correct grammatical errors within a writing task, offers recommendations for better productions and extra resources for the following studies. In EFL writing, the assistants such as Grammarly, AI Writer and Essaybot help learners to evaluate their written products individually, make necessary correction and edit their essays on their own. In addition, these tools promote the development of self-regulation and autonomous behaviours of learners.

Chatting robot (chatbot) is one of the AI-powered tools that have been used in EFL classrooms. Chatbots provide users with informal interaction both in a spoken and written form with a robot in a foreign language (Jia, 2008). Thanks to the tool, learners can get direct response to their questions and messages as well as getting feedback on their performances and tips for improving their learning. In addition, it was highlighted in one of the articles reviewed for the current study that it was both more enjoyable and motivating for them to communicate with the robots than a student or teacher (Tsai, 219). The findings also

revealed that regular interaction with the chatbots contributed to the learners' self-confidence, attitude towards EFL learning, listening and speaking skills positively.

4. CONCLUSION

In this study, it is attempted to review the research articles published between 2015 and 2021 in the field of the use of Artificial Intelligence in EFL teaching and learning. Brought to the foreground due to popularity and proliferation on AI-supported application almost all aspects of live including educational environments, the research on Artificial Intelligence and the language learning apps using that technologies have been regarded as one of the mainstream issues in the field especially for the last decade. Thus, this review emerged with the aim of presenting a full picture of the main focuses of the themes regarding AI and foreign language learning and teaching for researchers with its close inspection of 19 journal articles that fit certain criteria.

The review revealed that most AI studies were conducted with EFL learners in university contexts. As for the countries where the studies were conducted, 8 countries provided the settings for the studies within the confines of the current review. The themes which were researched in these studies were certain concepts such as the place of Artificial Intelligence in language learning apps, preparing teachers for AI-powered technologies in language teaching, practical instruction for teaching four language skills and components, AI technology for classroom behavioral management and using anthomorphized robots for practice. Finally, the research methodologies that were employed in the studies were also investigated, and it was revealed that except for eight of the studies that employed state of art research design, there was almost an equal distribution of quantitative, qualitative and mixed method studies with one each article review and in the wild research design. As for their data collection instruments, studies mostly preferred interviews (9), questionnaires (7) followed by focus group discussions, achievement tests, reflection reports, and diaries.

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