AIER
ARTIFICIAL INTELLIGENCE in EDUCATIONAL RESEARCH

Development of Artificial Intelligence Technologies and Language Learning[1]

Gökhan Yigit[2]

Review Article **Received:** 13.05.2024 **Accepted:**22.05.2024

Abstract: Rapidly developing artificial intelligence applications deeply affect education as well as other fields. Based on the literature review, the current study basically examines the relationship between artificial intelligence and education in general, and foreign language education in particular. This study discusses how the roles of students and teachers are affected by the integration of artificial intelligence tools into education and the pedagogical changes. Many studies mention the advantages and disadvantages of using artificial intelligence-based technologies in educational processes. When technology-based education is considered, the first addressed issue is the individualization of education. With technological developments, educational processes have the potential to become unlimited with time and place and hence it is necessary to shape educational processes according to the interests and needs of the learners and to reshape the courses pedagogically with new technological developments. Additionally, teachers need to think over how to develop their understanding of technology use in classes and teacher professionalism. Finally, the research examines artificial intelligence-based mobile applications for foreign language teaching and reveals that these applications are still at an early level.

Keywords: artificial intelligence, language learning, English learners, teachers.

[1] Doi: 10.5281/zenodo.11243867
[2] Author, gokhanzel@hotmail.com, Kafkas University, ORCID: 0000-0001-7381-0731

The increase of AI and its use in language learning

The use of artificial intelligence in data science, information science, and other fields has increased dramatically. However, the use of artificial intelligence (AI- hereafter) in language learning is a newly developed area. According to Pickhart (2020), none of the apps used for language learning include any type of AI, deep learning, and machine learning. Instead, they are primarily built using pre-established techniques incapable of making the most of the computer power that is available now. However, the newly released AI programs such as ChatGPT have taken a great interest of every field including education since it has a great capability in many fields like paraphrasing, editing, and generating texts, translating complex sentences, and solving questions of different fields (İpek et al., 2023). With an increasing pace of technological developments, some companies started to integrate AI based tools to their teaching programs.

The astonishing developments in AI technologies and their use in educational contexts have brought considerable concerns in some aspects as well as its contributing effects to learning. For instance, İpek et al., (2023) inform that instructors in universities question the potential misuse of such instruments in education; therefore, they are trying to find ways of hindering such misuses. The idea behind the concerns of instructors is that AI tools help learners cheat in that they do not spend any effort to get the knowledge. In a similar vein, the influence of ChatGPT on academic writing particularly in essay writing has been a significant issue for the instructors. The concerns of the instructors basically on the capability of AI based tools such as ChatGPT to generate writing assignments as their own (Rudolph et al., 2023). Henceforth, legal and ethical problems (UNESCO, 2023) can be observed in the tasks/ homework of the students although numerous advantages can be listed with the adaptation of AI technologies into education. Therefore, users of such apps should be aware of the potential of AI technologies to generate false and unethical information. In this regard, the stakeholders of education such as teachers, principals, and officials of Ministry of National Education must be able to have more conscious decisions on the implementation of AI technologies in teaching and evaluation processes.

Regarding the language learning, today, globalization and technological innovations maintain numerous opportunities to foreign language learners as these technologies help them interact with the native speakers from every part of the world. Removing the obstacles of communication between learners and target language users, all these opportunities granted with AI based technologies and web tools for communication have led language learners to gain cross-cultural experience (Karakaş, 2023), which is highly valuable for foreign language learning. According to Karakaş (2023), cultural misunderstandings are problematic for the communication because of misinterpretation of language, gestures, and customs. In this respect, AI technologies help learners lessen such misunderstandings by enabling them contextual information.

AI and Learners

The rise of AI in education has paved the way for shaping education at many points. The first and most important of these is the relationship between AI and learners. With AI, situations such as learning at learners' own pace and opportunities to meet the different interests and needs of each learner (e.g., Liu, Li, & Lou, 2024) have emerged. In other words, learning can be tailored to the student's individuality. One of the most prominent concepts with AI is the individualization of learning. While decisions in general classroom environments are mostly shaped by the general situation of the class, it can be thought that a learning environment that can meet student needs can be created in classes where AI technologies are integrated. It is very important to capture a parallelism between individual student needs and the learning goal. In order to reveal students' interests and abilities, Big Data analysis that can identify the students' needs and abilities can be performed. Thus, activities can be carried out for learning goals, depending on the students' learning speed, in line with the student's interests and abilities (MoNE, 2024). According to the report of MoNE (2024), integrating technology into classrooms is important in terms of not only improving individualized learning practices of

students in general but also meeting the needs of students with special needs. In this respect, individualization of learning can support educational practices in many ways including language learning.

In studies on AI applications and education, researchers (e.g. Grassini, 2023; Kannan & Munday, 2018; Rusmiyanto et al., 2023) draw attention to the importance of individualized learning. Advances in AI technologies may provide ample opportunities to foster foreign language learning through AI based tools since they are adaptable to individual needs. That is, such tools may create opportunities for learners to foster language learning as they are sensitive to learner characteristics and competencies (Schmidt & Strasser, 2022). For example, Viktorivna et al. (2022) state that AI tools provide personalized learning experience. Similarly, Rusmiyanto et al., (2023) maintain that ChatGPT and similar applications can analyze students' interests and that these applications can offer personalized learning skills to students.

AI tools can do anything and learners, without internalizing the knowledge, presents their homework and tasks generated from ChatGPT and this perspective may be disadvantageous for the learners since nobody benefits from such an understanding. In many studies (e.g. Zou & Li, 2015), it is stated that learning with portable tools have several advantages with the new teaching and learning methods such as blended learning, however, teachers have serious concerns about students' ability of self-control as mobile devices are used for pleasure and entertainment.

Similarly, in his study with teachers, Al-khresheh (2024) states that integrating ChatGPT into English teaching may have benefits such as personalized learning, but he concludes that such tools may have disadvantages such as linguistic fidelity, excessive dependence on these tools, and suppressing creativity. In other words, although these tools help both learners and teachers in many ways, some teachers in the research exclaim that excessive use of these tools by the students make them dependent on every bit of learning. Henceforth, overreliance on AI based tools discourages students from conveying their responses and creating their unique expressions.

One of the important factors affecting the learning process is students' target language levels, learning styles and preferences. It is very important to set educational goals appropriate to the level in the foreign language teaching process. According to Krashen (1981)'s Input Hypothesis, in order for learning to occur, the learned content must be slightly above the student's level which is called i+1. It can be said that content that is too much above or below the student's level will not ensure the student's linguistic development. Additionally, learners' learning styles and preferences are very different from each other. Learning styles are cognitive, emotional and physiological changes resulting from students' interactions and reactions in the learning environment (Lin, 2024). For example, it can be said that each learner will be more successful in different ways in the VARK (visual, auditory, read/write, and kinaesthetic) model proposed by Fleming and Mills (2001) or in the multiple intelligence theory of Gardner (2000). Since the individual differences of learners are not at the forefront in a teacher-centred classroom, students' learning styles and preferences are not taken into account. However, since it is inevitable for a student-centred approach to be at the forefront in an AI-based education, a classroom environment can be created by taking into account the individual factors that distinguish students from each other.

AI and Educators

With each new development integrated into education, the role of teachers in education is being questioned more and more each day. The main reasons underlying in this situation are the existence of information with new technologies, the teacher no longer being the source of information, and the idea that technology can replace the teacher. In other words, there are concerns about whether teaching without teachers is possible and especially whether AI applications replace teachers in the near future. Since AI applications are still in their early stages, the role of the teacher in education continues. Baskara & Mukarto (2023) also inform

that AI based tools such as ChatGPT lack human nuances, and hence, it is not possible for these tools to have as much cultural awareness as teachers. Therefore, it can be said that such applications can support the teacher in some aspects; however, Paiva & Bittencourt (2020) maintain that while technology shapes education, teachers cannot adequately prepare themselves for the changing educational environments. For instance, a global interest in AI for online learning is evident in recent times, but there is little guidance to support teachers for online learning. According to Paiva & Bittencourt (2020), the reason behind the failure of students in learning and their dropout is that there is a lack of support from their teachers in the management of online classes.

One of the most important factors that teachers should take into consideration is the integration of developing technologies into education. Therefore, they should know how to use these technologies and think about how they can make them more useful to students in their classes. However, Pickhart (2020) states that not being able to keep up with technological developments is an important problem for educators and that teachers fall behind in global competition. Therefore, teachers are responsible for pragmatically using AI-based content in various courses such as online lessons, e-learning platforms and integration of mobile devices in education.

In the context of language learning, many applications have been developed that English teachers can use in their lessons. Thanks to AI algorithms, teachers can improve students' interests, language levels, and cultural learning experiences (Karakaş, 2023) by using the contents of these applications. In other words, English teachers can make their classroom practices individual-specific by taking into account the individual differences of the learners with AI-based applications. Thus, the linguistic and cultural problems encountered by every student who interacts with the target culture can be answered immediately. Such interactions organized by the teacher can enrich the learning environment and ensure common understanding among students, breaking down prejudices, and creating an inclusive and global mindset (Karakaş, 2023).

Another problem teachers face is the time and effort spent in evaluating students' performance during the classes. Many teachers are aware that they need to constantly monitor the developmental process of their students, and this is a very tiring process. While AI-based applications allow students to learn at their own pace, they can also help teachers monitor their students, analyze and evaluate students' language outcomes. In this regard, Paiva & Bitttencourt (2020) argue that AI technologies can support teachers in revealing relevant information from student data, creating personalized interventions for individual errors, and assessing whether these interventions work. In other words, such applications can work as an assistant that supports the teacher in the classroom.

One of the important elements in the language learning process is checking linguistic errors and giving feedback to students. With the development of technology, error checking has become easier with AI technologies. For example, grammar checker tools such as Grammarly and Deeply are widely used in English writing education today. Providing targeted feedback (Baskara & Mukarto, 2023) from tools such as ChatGPT in improving English writing skills will help students improve these skills. In addition, it takes time and serious effort for teachers to review each student's homework. Detecting linguistic errors with AI-based tools and giving feedback to students can save the teacher a significant amount of time (MEB, 2024).

The support of AI-based technologies in reducing the workload that teachers complain about is undeniable. Moreover, these technologies can help teachers increase their students' performance while reducing their workload (İpek et al., 2023). It can be said that teachers who are worried about their workload may have low motivation to continue in the teaching profession and therefore may consider quitting teaching (Yigit, 2023). In this regard, reducing workload is vitally important in increasing teachers' professional satisfaction with the job. With reduced workload, teachers can focus more on teaching processes and students' needs. In other words, by reducing the workload, teachers can devote more of their energy and time to the development of

their students, and thus, students' success in learning the target language can be expected to foster.

Aiming to develop an application assisting teachers in the teaching process, Paiva & Bittencourt (2020) developed a tool called T-Partner. We can list the expected contributions of this tool to education as follows: (1) analysis of educational data taking into account pedagogical situations, (2) easy-to-understand and interactive visualization of relevant subjects for the instructor, (3) shaping educational resources such as video, text, etc. according to the curriculum and information content, (4) determining measurable criteria for whether the application is effective or not. The researchers expect their tools to refrain from errors and repetitive tasks of teachers. The tool is expected to achieve to analyze the educational data gathered from learning environment and serve them teachers for their pedagogical decisions.

The tools mentioned above can help teachers determine what kind of mistakes students make during the learning process, which subjects they need support on, the effectiveness of teaching, and whether learning outcomes are achieving curriculum goals. In other words, such AI-based educational tools can analyze learning processes more quickly and transparently, revealing the effectiveness of teaching. By this way, it can enable teachers to evaluate themselves in relation to the teaching process and their own professional development process as a teacher. Using AI based tools efficiently and integrating them into English classes are indispensable part of teachers' professional learning. That is, teachers' digital literacy and professional development are two valuable stages in teachers' careers (Al-khresheh, 2024). However, integrating AI-based tools such as ChatGPT into English teaching requires not only knowing how to use these tools technically, but also needing to go deeper by developing pedagogical strategies. As a result, teachers need to be aware of gradually increasing technology integrated classrooms and prepare themselves for more complicated teaching environments with AI integrated tools.

On the other hand, integration of AI integrated tools can be used in teacher education programs, especially in practicum schools. Pre-service teachers' teaching experiences in their early careers can be analyzed and hence they are more evidently supported and guided with the analysis results of such tools in that the pre-service teachers are effective in their teaching experience.

The changes in pedagogy and the integration of AI

It is inevitable that technology has a deep influence on social change including education; therefore, many countries are trying to support technological invests to the teaching and learning processes (Schmidt & Strasser, 2022). It can be said that new technologies that lead to social changes also necessitate pedagogical changes. Pickhart (2020) stated that students are also responsible for the learning processes, as well as the teachers who determine the content of the courses due to changes in pedagogical approaches. This can be attributed to the significant change in the knowledge and skill needs of students, who have been in a learning environment with radically different tools, especially after the 2000s. Teachers should be aware that they are in an environment where students can access the desired information with a single click. The role of the teacher is no longer the main source of knowledge. In AI-based applications, teachers should help students learn how to experience the knowledge acquired with new technologies.

When it comes to foreign language learning, it is very important to put language structures into practice. However, in addition to doing this practice collaboratively, student-student, it has also become possible to do this practice as student-AI tools with AI-based technologies. Schmidt and Strasser (2022) state that practice has a vital role in foreign language learning, and that it would be interesting for all students to individually improve their language skills in the changing language learning environment with AI-based smart applications. In other words, activities designed according to students' individual skills, levels, interests, and needs guide each student to achieve his or her unique learning goal.

We can say that computer algorithms know us better than we do. This is used very effectively in regulating the relationship between the customer and the business, especially those who can

offer personalized offers (Pickhart, 2020). Big Data obtained from the learner is subjected to a complex analysis process and how individuals will respond to any phenomenon is examined. In the relationship between the learner and AI, individualized learning analyses provide personalized learning, feedback in formative or summative assessment scenarios (Grassini, 2023), and active and student-centred learning (Cope & Kalantzis, 2016).

Although AI based environments, which emphasize individualized and student-centred learning, theoretically bring a new breath to the learning environment, it may take some time to radically change the classroom learning routines that have been implemented for many years. The main challenge here is whether students and teachers can adapt to new digital approaches. Considering that learning environments are becoming increasingly complex and classroom teaching must be organized by taking into account many factors, introducing a new variable into the learning environment will make the process even more complicated. In this regard, integrating AI-based foreign language learning environments with learner differences and teaching and practicing high-level subjects is still in its infancy for AI tools (Schmidt & Strasser, 2022). In other words, for the effective use of AI tools in learning environments, systems should be organized so that both students and teachers are ready and AI tools can be integrated into education.

In the process of learning a foreign language, it is very important for students to produce in the target language for their productive language skills. Creating authentic language materials and environments for production, speaking and writing in the target language make significant contributions to the realization of learning. For example, when someone learning English wants to improve their speaking skills, they need to communicate with people who speak that language. Before the development of technology, there were only two ways for a student who wanted to improve his speaking skills. These are: traveling to the country where that language is spoken or communicating with a tourist who speaks that language in tourist areas. In the classrooms, the classical way of learning is the rote learning of the linguistic structures disregarding the communicative competence oriented task (Schmidt & Strasser, 2022). However, with the development of technology, students have the opportunity to practice the target language regardless of time and place. AI based programs such as ChatGPT present opportunities to go beyond the rote learning of the traditional classroom experience and become more critical and creative what to be learned in classrooms (Rudolph et al., 2023). For instance, video chat programs and AI-based educational applications will enable the development of students' communicative skills. In other words, students can speak the target language with a native speaker via video chat programs without being limited by space and time. Until now, such tools were used informally outside the classroom, but these tools, which have an AI-based structure, can also be used in formal teaching processes. Karakaş (2023) recommends teachers to use these tools because, thanks to these tools, students can have a better understanding of different cultures and languages, taking into account individual needs. This can help them improve their cross-cultural communicative skills. In other words, with AI based tools, both teachers and students grasp opportunities for culturally and linguistically connection with the people of the world.

AI-based tools can be used at every stage of classroom education. Repetitive activities can be used for goal-oriented language use in effective foreign language teaching. In this regard, the use of repetitive and goal-oriented activities in lesson planning can ensure that linguistic structures are presented to students over and over again, thus ensuring the acquisition of the targeted content. One of the ways to offer these activities is to deliver them with AI-based tools. Repetitive tasks that can meet students' individual needs can be presented with such tools, taking into account the mistakes made by students in AI-based activities. Thus, students' foreign language can be improved by carrying out studies on the subjects that each student needs or lacks. According to Long (1998), teaching isolated linguistic items is out-dated and teaching grammatical units lead students fail and hence students are unable to develop their ability to communicate and use these structures in communicative tasks. The ideal teaching here should

involve communicative input that helps learners grasp the grammatical units in the communicative tasks (Fotos, 1998). For this purpose, AI based tools may help teachers regulate the learning environment with the goal oriented repetitive tasks since the use of repetitive language tasks plays a vital role in communicative activities in which learners focus on form by practicing their communicative competencies (Schmidt & Strasser, 2022).

AI based Mobile Apps

With the development of AI, several mobile applications used for language learning started to integrate AI based systems to their applications. Some of the most popular apps for foreign language learning are shown in table 1.

Table 1.

AI integrated mobile apps for foreign language learning

Name	Download	User score	Language level	AI support
Duolingo	500 mn+	4,70	A1- B2	GPT-4
Babbel	50 mn+	4,30	A1- C1	Yes- Speech recognition
Rosetta Stone	10 mn+	4,70	depends on the language / English 5	Yes- Assessment and immersive learning
Memrise	10 mn+	4,70	A1 - B1	Cutting-edge GPT-3
Busuu	10 mn+	4,70	A1- B2	Yes- vocabulary trainer
Mondly	10 mn+	4,50	beginning - advanced	Yes- Augmented Reality
Tandem	10 mn+	3,90	*any	Tandem GPT- written and spoken language
HelloTalk	10 mn+	3,00	*any	Yes- Grammar

Note: The language level of some applications depends on the level of the learners since they are programmed based on language exchange.

Table 1 above shows some of the most prominent foreign language teaching applications whose download number is more than 10 mn. The download and user score information presented in Table 1 was obtained from the Play Store application for Android phones. Information about language level and AI support was obtained from each application's own website. The applications stated that they base the language level on the Common European Framework of Reference for Languages (CEFR). Additionally, these apps offer content not only for English learners but also for many other languages. In terms of language level, they generally state that they provide language support starting from A1 to B2 and C1. Some applications, such as Rosetta Stone and Memrise, have set their own language levels. When user comments are examined, some users state that the difference between the levels does not coincide with the levels determined by CERF and that the intermediate and advanced levels are not different from the beginner levels, A1 and A2. Again, although the applications mostly state that they offer activities for all skills, these activities are mostly at the beginner level. Since Tandem and Mondly implement their system as a language exchange, we can say that the level of the users determines the language level. In other words, these applications aim to ensure that learners of language A and B transfer linguistic and cultural items to each other.

Nearly all the programs in the table started to integrate AI based tools into their applications after ChatGPT were presented to people. Some applications have integrated ChatGPT's algorithms into their own systems. For example, while Memrise uses Cutting edge GPT-3, Duolingo made an agreement with OpenAI and integrated GPT-4 into the Duolingo Max program. Although some applications, such as Babbel and Rosetta Stone, announce that they include AI technologies in the language learning process, they do not provide any information on their websites about which technologies are used. Some applications, such as Tandem and Mondly, state that they use AI-based systems they have developed.

These applications developed for language learning appear to use AI systems for different purposes. As seen in Table 1, most applications use AI-based systems as an aid to learners for pronunciation and speaking skills. Others appear to be integrating AI tools into their own applications for different language skills. For example, the Rosetta Stone application not only adds immersive programs for the development of the student's speaking skills, but also uses it to assess the student's development process. Regarding the instant feedback provided to learners, AI based tools are helpful for learning a foreign language since these programs are able to give instant feedback and assess learners by grading them (González-Calatayud, Prendes-Espinosa, & Roig-Vila, 2021). Tan (2020) also claims that in-depth analysis through machine learning is helpful for providing feedback to learners in the adaptation of learning content. On the other hand, Busuu application uses AI tools to facilitate vocabulary acquisition and enable students to learn words that they have difficulty learning. In their website, HelloTalk states that users use AI tools to check grammatical errors. It can be said that several applications started to integrate AI based technologies into their programs; however, what should be asked is to what extent these tools boost learning, or facilitate teaching. Although such programs are attractive to the society, it is more important whether the use of these programs takes education one step further. In other words, it should be avoided from general-purpose technology in ways that do not result in significant changes to student outcomes (Tan, 2020), and we need a clear explanation of how AI can be tied to the principles of teaching and learning.

Conclusion

When literature on AI and education is examined, it is clear that AI-based tools start to become more widespread in the education system. Studies find the use of AI-based tools in learning environments generally beneficial, although there are some concerns. Because AI tools greatly enrich learning environments. Materials and resources produced with AI tools provide important input to foreign language learners. Not only these inputs are not limited to written texts but also verbal inputs are also important language materials provided by AI tools. With AI tools, students can gain interactive communication experiences with native or non-native speakers from different cultures. This type of real-world communication and linguistic input can improve students' skills such as listening and speaking (Karakaş, 2023). In classrooms; however, the time given to students to produce linguistic output is quite limited. Sha (2009) states that native language teachers using the CLT method present authentic language through news and stories to students, but in such a situation, most of the students remain silent. In other words, the native teacher dominates the class and student talking time remains largely limited. The researcher argues that classrooms in Chinese universities have limited interaction between native and non-native speakers and prevent the development of speaking skills. Considering the number of students in the class, their shyness and lack of motivation, a similar situation is valid for students in Turkey. Therefore, the use of AI-based tools that provide students with more linguistic input and output opportunities in language learning processes can provide significant benefits in improving students' language skills.

With the development of AI tools, self-regulated learning opportunities are offered to students with some mobile applications. In the study of Zou & Li (2015), research findings reveal that students can learn English by using mobile learning apps and they can use them for their self-study. Such AI-based apps provide real-time feedback by evaluating students' performances (Karakaş, 2023). Thus, students can follow their language production and developmental processes. Considering these developments, it is questioned whether a language teacher is needed to learn a language. In other words, can AI tools be teachers with the advantage of unlimited space and time? The answer to this question is definitely no for education with AI technologies, which are still in their infancy. Because researchers (e.g. Pickhart, 2020) state that AI-based tools use basic vocabulary teaching and testing tools in language education and simple speech recognition is performed with AI. For example, Pickhart (2020) states that by imitating a user's intonation, speech recognition tools accept the answer as correct and therefore mobile apps are far from reality in language teaching. The mobile apps examined in Table 1 are in a

similar situation. In other words, although they state that they offer language support from A1 to C1 level, both the researcher's experience and other user comments reveal that the contents of these applications are largely at a basic level. AI tools can provide rich material for students in language learning, but using multimedia tools doesn't mean that students quickly master the acquisition of a second language. Considering all this, the role of the teacher is always vitally important in the learning and teaching processes. However, AI tools can act as an assistant for teachers in language classes.

The rapid development of AI-based tools means that such applications will become increasingly common both in and outside the classroom. However, the fact that students use these tools for unethical purposes and that teachers do not seem to give up traditional way of teaching easily seems to be an important problem for the healthy progress of this process. In future studies, it is very important to study on how students can use AI-based tools correctly in foreign language learning. In addition, it would be beneficial for teachers to learn how to integrate these tools into the classroom within the scope of in-service training and to provide their professional development on how to enrich foreign language classes by using these tools. To sum up, considering the relevant impact of AI based technologies, every aspect of communities should develop the relevant skills and knowledge needed for the future and it should be looked beyond the current trends (Tan, 2020) to identify the required skills in an AI integrated world.

Acknowledgment

Ethics statement: In this study, I affirm compliance with the rules outlined in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" and assert that none of the "Actions Against Scientific Research and Publication Ethics" have been undertaken. Furthermore, we declare that there is no conflict of interest among the authors, which all authors have contributed to the study, and that full responsibility for any ethical violations rests with the article authors.

Funding: This research received no funding.

Declaration of competing interest: There are no conflicts of interest related to this submission.

Institutional Review Board Statement: Since the study is a review article, there is no need for Institutional Review Board Statement for the article.

References

Al-khresheh, M. H. (2024). Bridging technology and pedagogy from a global lens: Teachers' perspectives on integrating ChatGPT in English language teaching. *Computers and Education: Artificial Intelligence, 6*, 100218.

Baskara, R., Mukarto, M. (2023). Exploring the Implications of ChatGPT for Language Learning in Higher Education. *Indonesian Journal of English Language Teaching and Applied Linguistics*, *7*(2), 343- 358

Cope, B., & Kalantzis, M. (2016). Big data comes to school: Implications for learning, assessment, and research. *Aera Open*, *2*(2), 2332858416641907.

Fleming, N., & Mills, C. (2001). VARK: A guide to learning styles. *Retrieved November*, *30*, 2004.

Fotos, S. (1998). Shifting the focus from forms to form in the EFL classroom, *ELT Journal*, *52* (4), 301–307, https://doi.org/10.1093/elt/52.4.301

González-Calatayud, V., Prendes-Espinosa, P., & Roig-Vila, R. (2021). Artificial intelligence for student assessment: A systematic review. *Applied Sciences*, *11*(12), 5467.

Grassini, S. (2023). Shaping the future of education: exploring the potential and consequences of AI and ChatGPT in educational settings. *Education Sciences*, *13*(7), 692. https://doi.org/10.3390/educsci13070692

İpek, Z. H., Gözüm, A. I. C., Papadakis, S., & Kallogiannakis, M. (2023). Educational Applications of the ChatGPT AI System: A Systematic Review Research. *Educational Process: International Journal*, *12*(3), 26-55.

Kannan, J. & Munday, P. (2018). New trends in second language learning and teaching through the lens of ICT, networked learning, and artificial intelligence. In Fernández Juncal, C. & N. Hernández Muñoz (Eds.). *Vías de transformación en la enseñanza de lenguas con mediación tecnológica*. *Círculo de Lingüística Aplicada a la Comunicación*, *76*, 13-30 http://dx.doi.org/10.5209/CLAC.62495

Karakas, A. (2023). Breaking Down Barriers With Artificial Intelligence (AI): Cross-Cultural Communication in Foreign Language Education. In *Transforming the Language Teaching Experience in the Age of AI* (pp. 215-233). IGI Global.

Krashen, S. D. (1981). Bilingual education and second language acquisition theory. *Schooling and language minority students: A theoretical framework*, 51-79.

Lin, X. (2024). Learning Styles and Second Language Acquisition: A Review of Influences, Factors, and Educational Implication. *Journal of Education, Humanities and Social Sciences*, *26*, 891-896.

Liu, H., Li, Y., & Luo, W. (2024, February). Artificial Intelligence in English Language Teaching. *3rd International Conference on Education, Language and Art (ICELA 2023)*, 120-131, https://doi.org/10.2991/978-2-38476-214-9_16. Atlantis Press.

Long, M. (1988, June 20-24). *'Focus on form: a design feature in language teaching methodology'*[Conference presentation]. The National Foreign Language Center European Cultural Foundation Conference on Empirical Research on Second Language Learning in Institutional Settings. Bellagio, Italy, Mimeo.

MoNE (2024). *Cumhuriyetin 100. Yılında öğretmenlerin gözüyle teknoloji ve eğitim bölgesel çalıştayları raporu*. https://ttkb.meb.gov.tr/www/cumhuriyetin-100-yilinda-ogretmenlerin-gozuyle-teknoloji-ve-egitim-bolgesel-calistaylari-raporu-yayimlandi/icerik/587

Paiva, R., & Bittencourt, I. I. (2020, June). *Helping teachers help their students: A human-ai hybrid approach* [Conference presentation]. International conference on artificial intelligence in education (pp. 448-459). Cham: Springer International Publishing.

Pikhart, M. (2020). Intelligent information processing for language education: The use of artificial intelligence in language learning apps. *Procedia Computer Science*, *176*, 1412-1419, doi:10.1016/j.procs.2020.09.151

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching*, 6(1), 342-363. https://doi.org/10.37074/jalt.2023.6.1.9

Rusmiyanto, R., Huriati, N., Fitriani, N., Tyas, N. K., Rofi'i, A., & Sari, M. N. (2023). The role of artificial intelligence (AI) in developing English language learner's communication skills. *Journal on Education*, *6*(1), 750-757.

Schmidt, T., & Strasser, T. (2022). Artificial intelligence in foreign language learning and teaching: a CALL for intelligent practice. *Anglistik: International Journal of English Studies*, *33*(1), 165-184.

Sha, G. (2009) AI-based chatterbots and spoken English teaching: a critical analysis, *Computer Assisted Language Learning*, 22:3, 269-281, Doi:10.1080/09588220902920284

Tan, S. (2020). Artificial Intelligence in education: Rise of the Machines. *Journal of Applied Learning and Teaching*, *3*(1), 129-133.

UNESCO. (2023). *Guidance for generative AI in education and research*. France.https://unesdoc.unesco.org/ark:/48223/pf0000386693

Viktorivna, K. L., Oleksandrovych, V. A., Oleksandrivna, K. I, & Oleksandrivna, K. N. (2022). Artificial Intelligence in Language Learning: What Are We Afraid Of. *Arab World English Journal*, 8, 262-273, Doi: https://dx.doi.org/10.24093/awej/call8.18

Yigit, G. (2023). *Challenges experienced by English teachers in rural state schools of Türkiye on the way of becoming professionals* [Unpublished doctoral thesis]. Anadolu University.

Zou, B., & Li, J. (2015). Exploring mobile apps for English language teaching and learning. In F. Helm, L. Bradley, M. Guarda, & S. Thouësny (Eds), *Critical CALL – Proceedings of the 2015 EUROCALL Conference, Padova, Italy* (pp. 564-568). Dublin: Research-publishing.net. http://dx.doi.org/10.14705/rpnet.2015.000394