



# Research on the Application, Challenges, and Countermeasures of Artificial Intelligence in English Teaching and Learning

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**Abstract:** Artificial intelligence has been applied in various fields and has brought new developments to these areas. In English teaching and learning, artificial intelligence optimizes the allocation of English education resources, breaks down the barriers of time and space, and enables English educators and learners to fully utilize their time to complete teaching and learning tasks. Artificial intelligence is the electronic teaching assistant for English teachers, and it is the electronic teacher and companion for students. Through automation and intelligence, artificial intelligence helps English teachers eliminate a significant amount of effort, giving them more time and energy to dedicate to teaching and increasing the effectiveness of English instruction. By offering individualized learning experiences, artificial intelligence aids students in increasing the effectiveness of their learning. However, artificial intelligence brings some challenges to English teaching and learning, and addressing these challenges can bring greater development to English teaching and learning and even the teaching and learning of other subjects.

**Keywords:** artificial intelligence, English teaching, English learning, education

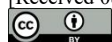
## Introduction

Artificial intelligence has brought convenience, innovation, and progress to various industries. In English teaching and learning, artificial intelligence overcomes the barriers of time and space, allows all English teachers and learners to use the same teaching resources at any time and any place, and reflects the fairness and openness of education. Artificial intelligence technology solves the limitations of teaching time, teaching space, teaching methods, learning methods, etc., optimizes teaching content, shares teaching resources, enhances learning experience, and improves classroom effectiveness <sup>[1]</sup>. At the same time, artificial intelligence innovates and changes traditional English teaching and learning, makes English teaching and learning more innovative, intelligent, and modern, and saves manpower, material resources, and financial resources.

Artificial intelligence provides English teachers with rich teaching resources, teaching plans, teaching designs, teaching activities, homework and paper grading, teaching evaluation, teaching feedback, etc. Artificial intelligence provides students with diverse learning materials, learning plans, various scenarios of human-computer interaction, automatic grading of submitted tests, learning analysis, learning feedback, and more. The functionality of artificial intelligence is so powerful that it covers almost every process of English teaching and learning, like an expert proficient in all subjects and fields. All relevant personnel in the field of English education can fully and correctly utilize artificial intelligence to serve the entire process of English teaching and learning and achieve the goal of improving students' English application level and knowledge level. Although artificial intelligence has brought endless benefits to English teaching and learning, the challenges of applying artificial intelligence to English teaching and learning should also be taken seriously and addressed appropriately so that artificial intelligence can be better applied to English teaching and learning.

## Literature Review

Artificial intelligence has been applied in various aspects of English teaching and learning, bringing many benefits to English teachers and learners. These benefits can be seen in a lot of literature. English teachers and learners can also deeply experience these benefits in real-life teaching and learning. Artificial intelligence technology can provide high-quality learning conditions for English teachers and learners <sup>[2]</sup>. The characteristics of artificial intelligence technology in practice encourage English learners to learn more frequently, which means that users can learn English anytime and anywhere; Artificial intelligence technology, with its vast database and analytical capabilities, frees teachers from some basic and repetitive work, improving their efficiency in teaching and unleashing more creativity <sup>[3]</sup>. Artificial intelligence technologies such as intelligent speech, intelligent grading, intelligent translation, and educational robots are widely used in English education, all the repetitive work and much of the administrative work in teaching in the past will be replaced by artificial intelligence, and the role of teachers will undergo significant changes <sup>[4]</sup>. The intelligent grading system based on machine vision utilizes handwriting recognition technology to automatically recognize students' handwriting, which can save teachers a lot of work time and improve work efficiency <sup>[5]</sup>. Artificial intelligence technology can improve traditional teaching methods, speech recognition technology and natural language processing technology can recognize



and correct students' oral expressions in real time, achieve automatic grading and feedback of students' homework and exam answers, thereby reducing teachers' workload and improving teaching efficiency [6]. The teaching application of artificial intelligence mainly utilizes the advantages of big data to achieve classroom optimization through the sharing and dissemination of information, ensuring the comprehensive utilization of English resources [7]. The integration of artificial intelligence and English teaching resources deepens the application of artificial intelligence in the field of English teaching, which can promote English teaching reform and modernization [8]. Artificial intelligence empowers education and promotes the optimization and improvement of the English teaching process, promoting a virtuous cycle in the teaching process [9]. Subject teaching methods have been greatly enriched and teaching activities have been contextualized with the support of artificial intelligence, providing unprecedented superior conditions for achieving precise teaching and personalized learning [10].

Artificial intelligence plays a significant role in English teaching and learning, but it also brings some challenges to English teaching and learning. Dealing with these challenges is one of the current and long-term tasks that requires joint efforts from multiple parties. These relevant parties include national staff, artificial intelligence developers, teachers, and students. Teachers should actively adapt to the changes in information technology, continuously learn, and use artificial intelligence technology to improve educational methods in a targeted manner in order to meet the challenges presented by artificial intelligence [11]. Students should make reasonable use of artificial intelligence.

### **The Application of Artificial Intelligence in English Teaching and Learning**

Artificial intelligence can be used by English teachers to prepare lessons, teach classes, grade assignments and papers, and provide feedback and evaluations. Artificial intelligence can provide teachers with intelligent lesson plans, rich teaching content and activities, reduce repetitive work, and allow teachers to devote more time and energy to teaching, thereby improving teaching efficiency. In the era of intelligence, artificial intelligence platforms will become teaching assistants for teachers, helping them complete daily repetitive and mechanical tasks [12].

Artificial intelligence can be used by students for self-directed learning. Students can preview before class and review after class with artificial intelligence. Artificial intelligence platforms allow students to fully maximize their fragmented time by self-testing their learning efficacy at any time and from any location. Timely feedback and explanations are provided by the artificial intelligence platforms, allowing students to improve learning efficiency, and achieve comprehensive development of the five skills of listening, speaking, reading, writing, and translation. Traditional English teaching and learning, due to factors such as the large number of classes and students taught by English teachers, requires students to wait for a long time to receive teaching feedback on submitted assignments, quizzes, and papers, which is not conducive to students' understanding and consolidation of knowledge. Traditional teaching feedback is usually verbal, and the feedback effect is not ideal if students cannot keep up. With the help of artificial intelligence, students can receive feedback within minutes or even seconds. For the feedback results, students can save them for future review. Timely, visualized, and storable learning feedback is very beneficial for students to learn and consolidate knowledge, as well as improve learning efficiency. Intelligent technology can provide timely feedback on assessments, record process data, improve teaching efficiency and quality, promote personalized learning, and enhance students' ability for self-directed learning [13]. Students use artificial intelligence platforms for English learning, and teachers can grasp students' learning situations through the teacher end, adjust their teaching content and methods, and improve teaching efficiency. Artificial intelligence platforms can analyze and push personalized learning plans and materials to students based on the collected learning situations. With these plans and materials, students can engage in self-directed learning according to their own schedule. Artificial intelligence can also provide different English teaching or learning materials based on the user's identity and personal needs, meeting the needs of different users. Artificial intelligence technology has played a significant role in teaching activities, and it can fully meet the diversity of students' knowledge needs [14].

#### **(1) The Application of Artificial Intelligence in English Listening Teaching and Learning**

In terms of English listening teaching and learning, artificial intelligence can generate listening materials, exercises, answers, and analyses based on the listening topic input by the teachers or students. After students submit their answers, artificial intelligence can immediately correct them. Students can obtain their scores and analysis report within a few minutes or even seconds. Artificial intelligence allows students to learn beyond the classroom. For difficult listening materials, students can also listen to them repeatedly after class. Artificial intelligence can achieve loop or intermittent playback of the same article, one sentence, or some sentences, allowing users to enhance their listening skills for the parts they need to strengthen. Artificial intelligence can also provide audios and videos of English pronunciations from different countries and regions, allowing users to listen to English pronunciations from various countries and regions. This will be of great help to users facing people from many countries and regions in their future life, work, or travel.

#### **(2) The Application of Artificial Intelligence in English Speaking Teaching and Learning**

In English speaking teaching and learning, artificial intelligence can create various scenarios for users and provide human-computer interaction. Users do not need to look for native English speakers to communicate. Users can have conversations with computers or other electronics, apply English online at home, and consolidate their learning in a timely manner. At the same time, users can also learn various scenario dialogues provided by artificial intelligence. Artificial intelligence can provide a standard British or American accent, and users can choose a British or American accent to practice speaking English according to their preferences. It's like having a British teacher and an American teacher serving and talking to the students at the same time. Artificial intelligence can also record students' conversations, correct their pronunciation and intonation, and encourage them to strive towards standard English pronunciation and intonation. In their interaction with the computer, students do not need to worry about ridicule from teachers or classmates. The

computer always acts as a patient teacher, responds to every student's question in a timely manner, provides students with a good learning experience, allows them to learn in a good mood, and gives them a sense of achievement rather than frustration. Students use human-computer dialogue for practice, which not only avoids the awkwardness that may arise in practice, but also quickly improves their English speaking skills <sup>[15]</sup>. Students have few opportunities to speak or apply English in traditional English teaching and learning. With the use of artificial intelligence, students can engage in English conversations at home, and it is a one-on-one conversation and service that traditional English classrooms cannot provide. Teachers need to take into account all students and give everyone a chance to speak in traditional English classrooms. This means that the conversation time allocated to each person is only a short minute or even tens of seconds, far from meeting the needs and intensity of practice. Therefore, the oral English proficiency of students trained in traditional English teaching and learning is relatively low, and many students dare not speak English. Artificial intelligence provides students with more opportunities to apply English, brings students an immersive learning experience, makes students confident, improves students' oral skills, and increases the fun of English learning.

### **(3) The Application of Artificial Intelligence in English Reading Teaching and Learning**

In terms of English reading teaching and learning, artificial intelligence can generate the required reading materials, answers, and analyses for users. With the help of artificial intelligence, students do not need to wait for teachers to grade their reading assignments. Artificial intelligence can complete grading and give the scores and analyses within minutes or even seconds after students finish the reading task. Students can update their knowledge points and consolidate them immediately. The reading comprehension topics are mostly natural sciences, social sciences, and humanities, with many terms that are relatively difficult to fully understand. Artificial intelligence can provide translation for the entire article, which helps teachers and students deepen their understanding and impression of the article, acquire knowledge from reading comprehension, and enhance their knowledge and understanding in various fields. Reading for the purpose of acquiring knowledge and applying it is the ultimate goal of reading, not purely for the purpose of completing reading instruction, obtaining correct answers, and preparing for assignments and exams. Artificial intelligence can not only help users improve reading efficiency but also provide related extension materials. ChatGPT, a representative of artificial intelligence, is a good example. ChatGPT can not only quickly summarize the core essence of a text to improve reading efficiency and conduct targeted text analysis to deepen understanding, but also provide expanded learning resources for certain points and broaden students' research perspectives <sup>[16]</sup>.

### **(4) The Application of Artificial Intelligence in English Writing Teaching and Learning**

In English writing teaching and learning, artificial intelligence can generate writing materials for users, provide writing templates, and modify writing submitted by students. Artificial intelligence can immediately intelligently modify and grade students' writing, point out errors in vocabulary, grammar, and sentence patterns, and provide suggestions for revision. Students can quickly understand their strengths and weaknesses and correct their mistakes. The dynamic learning process of repeated modifications based on this real-time assessment can promote the improvement of students' individual writing abilities <sup>[17]</sup>. At the same time, students can also learn from the intelligent templates provided by artificial intelligence and internalize them as their own knowledge to improve their writing skills. After the introduction of artificial intelligence writing correction platforms into college English teaching, there has been a significant improvement in students' writing learning outcomes <sup>[18]</sup>.

### **(5) The Application of Artificial Intelligence in English Translation Teaching and Learning**

In terms of English translation teaching and learning, artificial intelligence can generate translation materials for users, intelligently evaluate students' answers, and provide translation templates. Artificial intelligence is capable of providing pronunciation and explanation for each word in translation, as well as detailed analysis of the entire sentence. Artificial intelligence also provides textual or video explanations for idioms or allusions that appear in translation materials, allows students to deepen their impression and expand their knowledge, and makes them a person with cultural literacy and English application ability. The knowledge extension links provided by artificial intelligence are very specific and detailed, and students can choose whether to click on the links to obtain extended knowledge according to their own needs or situation.

## **Challenges and Countermeasures**

Artificial intelligence has brought innovation, change, and progress to English teaching and learning, as well as many challenges. How to address these challenges is a significant task for the present and future. To address these challenges requires joint efforts from relevant personnel, such as the national staff, artificial intelligence developers, educators, and learners.

Firstly, the application of artificial intelligence in English teaching and learning may pose a threat to users' information security and cause privacy breaches. Artificial intelligence platforms may collect personal search information and voice information of students and teachers, resulting in the leakage of identity information, teaching situation, teaching ability, learning situation, learning ability, and other information. For these situations, artificial intelligence should clarify user privacy protection regulations to protect personal information security. Artificial intelligence platforms are not allowed to collect personal information without authorization and must handle personal information properly. At the same time, the country should introduce relevant policies to strengthen supervision and management of artificial intelligence platforms, protect personal privacy and information security, and order rectification of illegal activities.

Secondly, the application of artificial intelligence in English teaching and learning may cause emotional alienation between teachers and students, as well as between students themselves. In English teaching and learning, the application and dependence of students on artificial intelligence to some extent means that the time and frequency of consulting with

English teachers will be reduced, resulting in reduced or no communication and interaction between students and teachers, which may lead to alienation and estrangement in the relationship between teachers and students. Similarly, students' application and dependence on artificial intelligence to some extent means that the time and frequency of discussions and exchanges between students will be reduced, which may lead to alienation and estrangement in the relationship between students. In these cases, English teachers need to constantly learn, improve their knowledge, insight, and comprehensive abilities, enhance their overall literacy, and teach in the classroom in conjunction with real-life situations. English teachers need to provide students with knowledge and insight, help students improve their discernment ability, shape students worldview, outlook on life, and values, provide students with humanistic care, help students improve their humanistic literacy, and make students feel warm. These are things that artificial intelligence cannot offer. The biggest difference between teachers and artificial intelligence is that teachers have human thoughts and emotions, and can also perceive and influence students' thoughts and emotions <sup>[19]</sup>. In learning, teachers should work harder than students, otherwise they cannot fulfill the responsibility of educating and nurturing students <sup>[20]</sup>. Students should study diligently, apply artificial intelligence appropriately and reasonably, and view artificial intelligence correctly. Students can use artificial intelligence to assist their learning, but they cannot rely solely on artificial intelligence. Students should ask teachers and classmates promptly if they have any questions. Furthermore, English teachers should strengthen classroom interaction and can use artificial intelligence to design interactive classroom activities. For example, English teachers can incorporate shooting short videos into classroom activities. Teachers can play videos taken by students in the classroom and collectively analyze the performance of each student. This activity is very interesting and can fully mobilize students' initiative and enthusiasm, enabling interaction between teachers and students, students and students, and promoting emotional communication and class unity. English teachers in the new era should return the classroom to students, strengthen interactive communication in class, organize one-on-one, one to many, and many to many interactions among students, and transform the English teaching process into a dynamic communication process between teachers and students, and between students <sup>[21]</sup>.

Thirdly, artificial intelligence may provide incorrect or irrelevant information. People from different regions may have different ways of expressing themselves, and sometimes artificial intelligence may not be able to accurately identify the meaning of the user, resulting in only providing answers related to the keywords of the question or giving incorrect, inaccurate, or incomplete answers. Artificial intelligence language models can answer most of the questions asked by users, but it is necessary to accurately question the model in order to obtain high-quality answers <sup>[22]</sup>. For these sorts of situations, artificial intelligence need to be continuously optimized, teachers should review the answers provided by artificial intelligence to ensure proper guidance is given to students, and students should identify the answers provided by artificial intelligence, rather than accepting them completely.

Fourthly, artificial intelligence may not be able to recognize language with relatively sloppy handwriting, cursive script and speech with accents. The speech recognition technology, image recognition technology, natural language processing, and intelligent scoring and feedback of artificial intelligence have indeed reduced the burden on teachers and improved work efficiency. However, artificial intelligence still has certain requirements for users' writing and pronunciation, such as using standardized characters, neat handwriting, writing in designated areas, and standard pronunciation. The recognition of sloppy handwriting, cursive script and accented speech by artificial intelligence is difficult or impossible. In such cases, it requires artificial intelligence to continue optimizing in order to recognize various forms of writing and the pronunciation and speech of people from different countries and regions. The development of artificial intelligence technology itself is not yet mature enough, and there is still a lot of room for development, mainly reflected in the inaccuracy of artificial intelligence technologies such as image recognition and speech recognition, which need to be continuously improved and perfected <sup>[23]</sup>. Due to the limitations of artificial intelligence, teachers should be aware that they cannot rely solely on artificial intelligence for grading and review, and teachers should conduct a second review.

The benefits of applying artificial intelligence in English teaching and learning far outweigh the drawbacks. Through the joint efforts of relevant personnel to address these challenges, artificial intelligence can fully realize its value and bring more possibilities, innovations, and greater achievements to English teaching and learning.

## **Conclusion**

With the rapid development of the Internet and artificial intelligence, the application of artificial intelligence in English teaching and learning is a general trend. English teaching and learning should keep up with the pace of the times and integrate artificial intelligence into all aspects of English teaching and learning. Artificial intelligence is the electronic teaching assistant for teachers and the electronic, knowledgeable teacher and learning companion for students. Artificial intelligence helps English educators do a good job in teaching, provides high-quality teaching plans and rich teaching content for every teacher, and reduces their work pressure. Artificial intelligence provides guidance to students, helps students learn English independently, provides students with platforms for self-directed learning, teaches students according to their needs and talents, benefits every student, treats every student equally, and does not let any student fall behind. The limitations of artificial intelligence are also worth noting. Both English teachers and students cannot rely solely on artificial intelligence. They need to develop critical thinking and correctly evaluate the knowledge brought by artificial intelligence, rather than accepting it in its entirety.

## **REFERENCES**

- [1]. Fan, Y. (2024). *Exploration into the Reform of Higher Vocational English Teaching Based on Artificial Intelligence*. *Public Relations World*, (8), 148-150.
- [2]. Wu, L. (2022). *The Impact of the Implementation of the Double Reduction Policy in the Post Pandemic Era on the Integration of Artificial Intelligence and English Teaching*. *English Square*, (19), 73-76.
- [3]. Zou, B. & Wang, M. (2021). *Artificial Intelligence Technology and English Language Teaching and Learning: Present and Future*. *Foreign Language and Literature* (bimonthly), 37(3), 124-130.
- [4]. Deng, C. (2021). *Opportunities and Challenges of College English Teaching in the Era of Artificial Intelligence*. *Journal of Hubei University of Economics (Humanities and Social Sciences)*, 18(6), 142-145.
- [5]. Teng, L. (2019). *The Four Dimensions of AI Education and Its Influence on English Teaching in Higher Vocational Schools*. *Journal of Suzhou Vocational University*, 30(2), 72-74.
- [6]. Cui, Y. (2024). *Research on the Construction of Ecological Teaching Model of English in Higher Vocational Colleges Based on Artificial Intelligence*. *Journal of Hunan Industry Polytechnic*, 24(2), 110-115, 121.
- [7]. Zhang, Y. (2024). *Reflections on the Development of Higher Vocational English Teaching Based on Artificial Intelligence*. *Journal of Hubei Open Vocational College*, 37(5), 172-173, 176.
- [8]. Guan, Y. (2020). *Design and Trend Outlook of English Teaching System Based on Artificial Intelligence*. *China Educational Technology*, (4), 2-3.
- [9]. Lu, Y. (2023). *Exploration of the Impact and Reform Path of Artificial Intelligence on English Teaching*. *Study of Science and Engineering at RTVU*, (3), 54-58.
- [10]. An, X., Shen, X., Zhou, Y., Bai, J., & Li, Y. (2023). *The Integrated Development of Artificial Intelligence and Teaching from the Perspective of English Teachers: Opportunities, Challenges and Promotion Paths*. *Modern Educational Technology*, 33(2), 71-79.
- [11]. Ming, J. (2021). *Research on the Application of Artificial Intelligence in College English Teaching*. *Modern Communication*, 547(05), 216-219.
- [12]. Bian, X. (2021). *A Preliminary Study on the Assistance of Artificial Intelligence in English Teaching*. *Reference for Middle School Teaching*, (28), 25-26.
- [13]. Li, Y., An, X., Li, L., He, J., & Zhou, Y. (2022). *Regional Ecological Construction and Practice on the Integrated Application of Artificial Intelligence and Subject Teaching*. *Chinese Journal of ICT in Education*, 28(10), 67-76.
- [14]. Zhao, Y. (2021). *The Impact of Artificial Intelligence on the Transformation of English Teaching*. *English Square*, (12), 119-121.
- [15]. Ye, S., Xia, T., & Yin, X. (2023). *Analysis of the Current Situation and Advantages and Disadvantages of Empowering Business English Education with Artificial Intelligence*. *English Square*, (26), 133-136.
- [16]. Xu, N. (2024). *Empowering Medical English Teaching with ChatGPT: Application and Its Pros and Cons*. *Medical Education Research and Practice*, 32(2), 218-223.
- [17]. Zhu, Y. & Zhang, M. (2020). *Research on the Application of Artificial Intelligence in Undergraduate English Teaching*. *Western China Quality Education*, 6(11), 116-117, 123.
- [18]. Jin, C. (2022). *A Study on the Application of Artificial Intelligence in College English Teaching under the Information Environment*. *Journal of Changchun Normal University*, 41(7), 163-165.
- [19]. Lu, Y. (2020). *On the Function of Teachers in English Teaching in the Era of Artificial Intelligence*. *Liberal Arts Guidance*, (7), 24 & 85.
- [20]. Li, L. (2020). *Development Trend and Coping Strategies of English Teaching in the Perspective of Artificial Intelligence*. *Journal of Hubei Open Vocational College*, 33(12), 156-158.
- [21]. Li, T. & Xu, Q. (2020). *Research on the Path of English Teaching Reform under the Background of Artificial Intelligence*. *Modern Communication*, 520(02), 7-8.
- [22]. Ding, J. (2023). *The Integration and Development of Artificial Intelligence and College English Teaching from The Perspective of Educational Informatization*. *Educational Informatization Forum*, (9), 3-5.
- [23]. Cai, S., Weng, L., & Yan, J. (2021). *Research on the Application of Artificial Intelligence in English Teaching in Primary and Secondary Schools*. *English Square*, (29), 131-133.