

Application and Challenges of Artificial Intelligence in Primary English Education: Opportunities and Strategies

Wenjing Wang

Tangwang Central Primary School, Licheng District, Jinan City; College of Education, Zhejiang University, 250000

ABSTRACT

With the rapid development of artificial intelligence technology, more and more education fields have begun to explore its application, especially in primary English education. AI can not only provide a personalized learning experience, but also increase students' interest and engagement through intelligent teaching tools. The extensive application of AI technology in the field of education has brought about the innovation of teaching tools, the transformation of classroom teaching, and the intelligence of teaching evaluation. However, the application of AI in primary English education also faces many challenges. First of all, insufficient training of teachers in AI technology may lead to technical barriers and waste of resources. Second, over-reliance on technology can impair students' self-directed learning and social skills. In addition, data privacy and security issues need to be taken seriously to ensure that students' information is not misused. To effectively address these challenges, educators and policymakers need to develop strategies accordingly. First, the training of teachers should be strengthened to enable them to become proficient in the use of AI tools. Second, schools should establish reasonable specifications for the use of technology to ensure the organic combination of technology and traditional teaching methods. Finally, strengthen data protection and privacy policies. Through these strategies, the application of AI in primary English education will be more effective and can provide students with broader opportunities for language learning.

KEYWORDS

artificial intelligence; English education in primary schools; Applications & Challenges

1 Introduction

The rapid development of artificial intelligence (AI) in the field of education has attracted widespread attention. The application of artificial intelligence in education can be traced back to the 60s of the 20th century, when researchers began to explore how to use computer-aided teaching. Early system techniques were relatively simple, focusing on programmatic instruction and basic feedback mechanisms. In the 21st century, adaptive learning technology has gradually become a hot topic in the field of education. The AI system can analyze students' learning data in real time and dynamically adjust the learning content and difficulty. In recent years, the use of AI in education has been further boosted by the advent of intelligent tutoring systems and virtual assistants that are capable of natural language interaction with students, answering questions, and providing learning suggestions. Primary school is a critical period for language learning, and AI can improve students'

English learning ability efficiently and conveniently, AI can analyze students' learning data, identify their strengths and weaknesses, and recommend suitable learning materials and exercises. Correct pronunciation and grammatical errors in real time through speech recognition and natural language processing technology; Provide an online learning platform where students can interact with their peers and share learning experiences and resources..... This paper mainly discusses the application of AI in primary English education, analyzes the opportunities and challenges it brings, and proposes corresponding strategies.

2 Literature review

2.1 Definition and classification of AI in the field of education

The concept of AI in education is complex and diverse. In the field of academic research, people often use three terms: "Artificial Intelligence Education" (AIE), "Education Artificial Intelligence Intelligence" (EAI), and "Artificial Intelligence in Education" (AIEd) to characterize artificial intelligence in education (Meng, & Wang, 2021). In general, the three types of AI education concepts mentioned above in the field of education can be divided into two categories: Artificial Intelligence Enabling Education (Learningwith AI) and Artificial Intelligence Subject Education (Learning about AI). This classification emphasizes that the educational concept of AI is not only instrumental, technical, and multidisciplinary, but also a complex collection of concepts, and AI has different educational roles from the perspectives of instrumentalism and subject teaching.

2.2 Research results on the application of AI in primary English education

In recent years, the development of artificial intelligence teaching products in foreign countries has mainly focused on adaptive teaching platforms, educational robots, smart campuses, personalized teaching systems, etc., and some artificial intelligence learning products have been developed, such as Knewton and Mooc. With the increasing maturity of technology, artificial intelligence has also developed a wealth of products in primary school English education that serve students and teachers, such as Yang Huizhong and Gui Shichun established a corpus of Chinese English learners, so that students can access resources more easily and quickly; Professor Jia Jiyou's intelligent speech learning system "Xisaike"; There are also feature-rich essay grading software and more. The emergence of these products has greatly broadened the way for students to learn English, and also provided great convenience for teachers.

2.3 Challenges of AI literacy

In K-12 education, there are certain misunderstandings about the perception of AI among teachers and students, and the technical literacy of teachers and students cannot be ignored. On the one hand, artificial intelligence can rely on rich databases and powerful algorithms to help students achieve adaptive learning, and in terms of teaching, realize scenario simulation, and truly become students' personal learning assistants. Even so, we cannot ignore the limitations of artificial intelligence, which is difficult to replace human teachers, unable to replace human teachers to achieve the cultivation of emotions and will, and it is difficult to achieve higher-order thinking activities such as innovation by relying on knowledge reorganization. In addition, the over-reliance on intelligent technology is not conducive to the cultivation of students' critical thinking, reduces interpersonal interaction, and makes students fall into the trap of learning isolation. Inadequate data protection mechanisms may also bring the risk of privacy breaches.

3 The application of AI in primary school English education

3.1 Innovation in teaching tools

The application of artificial intelligence technology in the field of English teaching has brought many innovative tools, which have greatly improved the teaching effect and learning experience. For example, when it comes to intelligent language learning applications, some applications such as Duolingo and Babbel leverage AI algorithms to provide personalized learning experiences. These apps help students learn vocabulary, grammar and speaking by adapting lesson content and exercises to the user's pace and performance. Some speech recognition tools such as Google Speech Recognition and SpeechAce can help students practice pronunciation. AI is able to assess students' pronunciation accuracy in real-time and provide immediate feedback to help them correct mistakes; Convenient and efficient online writing tools such as Grammarly and ProWritingAid can use AI technology to analyze students' writing and provide advice on grammar, spelling, and style (Xing, & Xiaoyin, 2022). These tools help students improve their writing skills and enhance the accuracy and fluency of their language expressions; AI-powered virtual conversation partners such as Replika and ChatGPT can practice English conversation with students. These tools simulate real-life conversation scenarios to help students improve their speaking skills and confidence.

3.2 Transformation of classroom teaching

AI helps teachers design interactive classroom activities. In the classroom, teachers can use speech recognition technology to help students practice speaking. AI can assess students' pronunciation in real-time and provide instant feedback to help them correct mistakes. This technology can be achieved through smart speakers or dedicated learning devices. For example, in the English class of Quanjing Middle School in Lixia District, Jinan City, teachers use artificial intelligence speech technology to monitor students' pronunciation in real time, and accurately grasp students' real-time learning situation with the help of a visual big data feedback platform.

3.3 Intelligence of learning assessment

AI can evaluate students' learning effectiveness in real-time, providing feedback and suggestions for adjustments. A primary school in a certain area has developed the "Speaking 100" primary school English smart APP, the school's primary school English teachers will have some homework issued on the software every day, students use "Speaking 100" for after-school English learning, listening and speaking training, etc., the system will automatically score and evaluate students, students can also communicate in the APP, and conduct oral competitions in the smart space. Teachers can monitor the completion status, quality and completion time of students' homework through the teacher portal.

4 AI challenges in primary English education

4.1 The role and preparation of teachers

As an emerging educational technology, AI teaching has a strong development momentum, and teachers as the leader of education must take a series of measures to deal with the challenges brought by AI teaching while enjoying the convenience and efficiency brought by AI. Teachers first need to understand the application of AI in education, including intelligent tutoring systems, automatic grading tools, and personalized learning platforms. Knowing the pros and cons of these tools can help teachers better integrate them into the classroom. While AI can provide a wealth of

information and resources, teachers should encourage students to think critically about this information. Guide students to think about the reliability and accuracy of AI-generated content, and help students develop the ability to analyze and evaluate information. Also, while AI can provide many conveniences, human interaction is still crucial in language learning. Teachers still need to create authentic, contextual teaching activities that encourage communication and collaboration among students, and focus on students' emotional needs.

Effective integration of AI in the classroom requires professional development and training by teachers. Teachers should continue to learn and adapt to new technologies, and participate in relevant training and seminars to improve their technical literacy. Knowing how to use AI tools effectively can help teachers play a better role in teaching. In addition, it is worth noting that teachers need to pay attention to the ethical aspects of the use of AI in education, including data privacy and security, ensure that students' personal information is protected, and follow relevant laws and regulations when using AI tools.

4.2 Student Engagement and Dependency

AI technology may lead students to rely on technology and reduce their motivation for self-directed learning. First of all, AI technology is not conducive to cultivating students' learning initiative and autonomy. AI English teaching platforms often provide customized learning paths through algorithms, and students only need to follow the system's guidance to complete learning tasks. Although this method can ensure the pertinence and efficiency of learning, in the long run, students may gradually lose the ability and willingness to set their own learning goals and find learning resources independently. When there is a lack of AI teaching tools, students may feel at a loss and do not know how to organize and plan their own learning, which is very detrimental to cultivating students' learning initiative and autonomy. Second, AI technology inhibits the formation of students' critical thinking to a certain extent. AI English teaching tools tend to pursue maximum accuracy and objectivity when providing learning content and feedback. However, language learning is not only a process of acquiring information, but also a process of developing critical thinking skills. Students need to learn how to analyze, evaluate, and critique information. Relying too much on AI teaching can lead to a lack of opportunities for students to think deeply and question what they are learning, in which case they may simply passively receive information rather than actively participate in thinking and discussion. Finally, English teaching is essentially language teaching, which is inseparable from real social interactions between people, and over-reliance on AI teaching tools may lead to students' lack of experience and opportunities for face-to-face communication, affecting their ability to use English in real situations. For example, they may excel at understanding grammar and vocabulary, but struggle to express their thoughts fluently in actual conversations.

5 AI and the future of English education in primary schools

5.1 Support for education policies

The rapid development and widespread application of artificial intelligence (AI) in the field of education has opened up new paths for the transformation of learning methods, but also posed new challenges to the education sector: how to promote innovation while protecting students' rights and interests, ensuring educational equity, and upholding the basic ethical principles of education. To achieve these goals, the education sector needs to develop a series of policies to regulate the use of AI in education.

On the one hand, there is a need for clear policies and guidelines. The education sector should start by developing a clear policy framework that clearly identifies the goals, scope, principles, and limitations of AI application in education. This includes, but is not limited to, protecting student privacy, ensuring data security, maintaining educational equity, and promoting the improvement of education quality. At the same time, guidelines should be formulated to guide developers and educational institutions to comply with relevant ethical standards and legal requirements when designing and implementing AI education programs.

On the other hand, data protection and privacy policies are strengthened. With the application of AI in education, a large amount of personalized learning data is collected, processed, and analyzed. The education sector needs to develop strict data protection policies to ensure the security of students' and teachers' personal information and prevent data leakage and abuse. At the same time, the protection policy should cover the entire process of data collection, storage, processing and sharing, ensure transparency and auditability, and let students and parents understand how their data is used.

In addition, teachers and students are trained in the necessary AI literacy. The introduction of AI technology has changed the education ecosystem, and the role of teachers has also changed. The education sector should provide teachers with opportunities for professional development, including training on how to effectively integrate AI technology into the teaching process, how to use AI tools for pedagogical innovation, and how to evaluate the effectiveness of AI education tools. At the same time, it is necessary to consider the ethical and legal responsibilities faced by teachers when using AI technology, and provide them with appropriate guidance and support.

5.2 Future research directions

Optimization and personalization of adaptive learning systems. Future research can further explore how AI technology can be used to achieve more accurate and personalized learning experiences. The development and upgrading of the primary school English adaptive learning system should be based on the real learning situation of primary school students' English learning, and design interactive programs that adapt to students' learning progress, preferences and comprehension skills from the perspective of students themselves, so as to provide tailored learning paths. Research can focus on improving algorithms to achieve a more precise match to students' needs, while taking into account emotional factors, so that AI tools can better motivate primary school students to continue learning and engagement.

Development of multimodal learning interactive experiences. With the development of technology, primary school English teaching can incorporate more multimodal interactive experiences, such as AR (augmented reality), VR (virtual reality) and MR (mixed reality) technologies to provide an immersive learning environment (Timms, 2016). This will not only enhance students' interest in learning, but also help them better understand and memorize knowledge points. Future research can explore how to combine these technologies with AI to improve students' language skills through virtual scenarios and role-plays.

6 conclusion

Artificial intelligence technology and its applications have been developed for more than decades, driving the development of all walks of life. However, the application of artificial intelligence in English teaching is lagging behind. In the next five to ten years, as AI technology matures, it can be predicted that its application in teaching will also accelerate. There are still many problems with the application of AI technology in English language teaching, and once these

problems are solved, many English learners will benefit for a lifetime, and at the same time, it will also promote the education industry into a new era. Educational researchers and practitioners need to realize that AI can not only empower English education, but also apply it to personalized instructional design, interactive classroom practice, and real-time dynamic monitoring. In the future, how to balance opportunities and challenges, and use AI technology to promote the improvement of educational equity and quality is the direction that educators, technology developers, and policymakers need to consider and work together.

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