Journal of Artificial Intelligence Practice (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/jaip.2024.070325
ISSN 2371-8412 Vol. 7 Num. 3

The Current Status, Development Bottlenecks and Future Prospects of the Application of Artificial Intelligence in English Teaching at Basic Period from the Perspective of "Internet+"

Boyan Cai*

School of Foreign Studies, South China Normal University, Guangzhou, Guangdong, 510631, China
1203829639@qq.com
**Corresponding author*

Keywords: Artificial Intelligence; English Teaching at Basic Period; Core Literacy of English Subject; Development Bottleneck; Future Prospects

Abstract: English teaching should be incorporated with modern information technology, especially artificial intelligence technology, so as to foster the innovative, composite and application-oriented talents with an international outlook in a more favorable manner. In the wake of the speedy development of science and technology, artificial intelligence has exhibited explosive growth in various fields, which has also presented opportunities and challenges to English teaching in basic period. On the one hand, it has exploited diversified learning paths, while on the other hand, there are also some development bottlenecks owing to the lagging technology and shortage of talents. By conducting a mixed-methods study on a sample of 4,085 students from School Q in City J, this paper presents a more comprehensive compendium and analysis of the specific application of AI technology in English teaching in basic period, in addition to researching and summarizing the merits and dilemmas of AI technology in English teaching in basic period. Moreover, it also puts forward strategies such as incorporating interdisciplinary research teams and cultivating composite talents to address the existing development bottlenecks, in an attempt to provide theoretical references for future research on the application of AI technology to the new model of English education and teaching in basic period.

1. Introduction

At the end of May 2023, the Ministry of Education and eighteen other departments jointly issued the *Opinions on Strengthening Science Education in Primary and Secondary Schools in the New Era*, which proposed to deepen the reform of school teaching and improve the quality of science education[1]. It is necessary to explore the use of artificial intelligence, virtual reality, and other technological means to achieve improved and strengthened experimental teaching. In line with the continuous progress and application of science and technology, artificial intelligence technology has penetrated into various fields, which has exerted a far-reaching influence on society. In the field of

education, AI technology has also progressively become a powerful tool to change the teaching method and improve the teaching effect[2]. In particular, the application of AI technology in English teaching in the basic period provides students with a more personalized and efficient learning experience, thereby initiating a new chapter in the teaching mode[3].

As a consequence, what development bottlenecks are currently faced by the application of AI technology in English teaching in the basic period? What are the ways in which they should be addressed and innovated? An in-depth analysis of the current status and dilemma of the application of AI technology in English teaching in the basic period will be instrumental in better applying AI technology in the field of English education, providing beneficial lessons and references for schools, teachers decision-makerskers[4]. It will also facilitate the innovation and development of AI technology in English teaching, provide students with a more intelligent and personalized learning environment, and advance English teaching to high-quality development and the overall enhancement and development of education, so as to move closer to the strategy of "education powerhouse"[5].

2. The Dilemma of the Application of Artificial Intelligence Technology in English Language Teaching at the Foundation Stage Stage

2.1 Infrastructure and Resource Constraints

Infrastructural and resource constraints have become a major challenge for AI technology in English language teaching and learning in basic period in many districts, especially in schools in remote areas[6]. Infrastructure and resource constraints limit the ability of schools to purchase and update advanced AI equipment and software. High-quality AI educational resources require significant investment, which can be a significant burden for schools with limited funds. The lack of updated equipment and software means that students do not have access to the latest teaching and learning technologies and resources, thus preventing them from keeping up with the times. In addition, the lack of technological equipment also affects students' access to and use of AI teaching resources. In the absence of equipment, students may not be able to fully experience the application of AI technologies such as virtual reality, augmented reality or voice recognition, which will limit their room for interaction and exploration in English language learning, and affect their motivation and incentive to learn. In addition, for schools with limited budgets, the cost required to maintain the equipment may be beyond their affordability. This leads to frequent breakdown or obsolescence of the equipment, which further affects the continuity and stability of teaching and learning. Students may experience difficulties and frustrations in using the equipment, thus reducing motivation and interest in learning.

2.2 Lack of Composite Talents

The lack of composite talents is a common problem in the field of education, which is more prominent in the process of applying AI technology to assist teaching[7]. Effective application of AI technology requires composite talents with professional knowledge of English teaching and relevant technical knowledge. However, as teachers in many schools may lack relevant technical knowledge and training, many teachers do not understand how to maximize the use of AI technology to assist teaching and learning, which leads to limitations in the application of AI technology and the inability to give full play to its potential. Lacking knowledge and training in AI technology, teachers may not be able to integrate it into their teaching practice and can only apply AI technology to some simple application scenarios, without being able to take advantage of its benefits in providing individualized teaching and intelligent assessment.

In today's digital era, English education in basic period needs to keep pace with technological development and organically integrate AI technology with teaching. However, if teachers in schools lack relevant technological knowledge and training, schools may not be able to introduce and utilize AI technologies effectively, missing opportunities to enhance teaching quality and efficiency, and thus resulting in inadequate learning experiences for students. Students are usually highly receptive to new technologies and learning styles, and they expect a more individualized, flexible and diverse learning experience through AI technologies. Therefore, if teachers in schools are not skilled in using AI technologies to meet students' learning needs, students may not be able to fully experience the advantages of AI in teaching and learning, which may affect students' motivation and initiative in learning.

2.3 There are Data Privacy and Ethical Issues

Protecting the privacy and security of student data is crucial when applying AI technologies, but it also increases the responsibilities and challenges for schools and teachers when using AI technologies. Students' personal information and learning data may be exposed to risks during data collection, storage and processing. If these data are not properly protected, it may lead to a breach of students' privacy and affect the trust of students and parents. The use of student data by schools or teachers without clear purposes and specifications may lead to misuse of the data. For example, the use of data for other commercial purposes or unauthorized use without students' consent may give rise to ethical controversies.

On the other hand, the decision-making models of AI technologies may be affected by data bias, leading to discriminatory assessments of certain students or groups[8]. This may have an unfair impact on students' learning opportunities and growth. Lack of adequate data security awareness and skills on the part of schools and teachers can lead to vulnerabilities in the process of data collection, storage and transmission, thereby increasing the risk of data being hacked or misused. With the rapid development of AI technology, relevant legal and ethical norms may be lagging behind and have not yet fully adapted to the new challenges of AI application in education, which may expose schools and teachers to legal risks and ethical dilemmas. Due to concerns about data privacy and ethical issues, students and parents may question and resist the application of AI technologies, resulting in compromised application effectiveness.

2.4 Slow Iteration of Technology Updates and Changes

Artificial intelligence technology is constantly evolving and updating, with new applications and tools emerging all the time. This also raises the issue that schools and teachers need to constantly keep up with the latest technological developments and update their teaching content and methods. This requires schools and teachers to remain flexible and adaptable while not getting caught up in the flood of new technologies. The slow pace of technological updating and iteration of change is a notable dilemma in applying AI technology to the teaching of English at the Foundation Stage level. The rapid development of AI technology and the emergence of new applications and tools mean that schools and teachers need to keep up with the latest technological developments and update their teaching content and methods in a timely manner. However, it is a challenging task to remain flexible and adaptable and not get caught up in the flood of new technologies.

On the one hand, due to the rapid changes and iterative updating of technology, teachers may not have sufficient time and resources to understand and learn about new AI technologies, and thus may not be able to apply them to their teaching practice in a timely manner. On the other hand, against the backdrop of the emergence of AI technologies, schools and teachers may be faced with a large number of technology choices, with different products and tools having their own characteristics,

which may result in difficulties in making choices[9]. Schools and teachers will need to spend more time evaluating and comparing different technological options, thus affecting the time they spend on teaching and learning with a genuine focus on student learning and development. From the macro perspective of schools, they need to invest in capital and manpower to train teachers and purchase and maintain new technological equipment to keep the teaching and learning environment up-to-date and evolving. However, this may also be challenged by budgetary and resource constraints, resulting in a relatively slow process of technology upgrading.

2.5 Exacerbating Imbalances in Educational Resources

Exacerbating the imbalance of educational resources is also a major challenge in the application of AI technology to English language teaching. In some schools or districts, imbalances in resources have resulted in some students not being able to enjoy the advantages of AI technology in teaching, which may further exacerbate educational inequity as only a few students are able to benefit from advanced technology applications while others still face a lack of teaching resources. In schools with advanced AI technologies, students may be able to experience a more individualized learning experience with more targeted learning resources and aids. In schools with relatively few resources, students may not be able to take advantage of these benefits and may face limitations in what and how they are taught.

Imbalances in educational resources due to the gulf in the use of AI in schools in different regions may affect the academic performance and development of students. Schools with advanced AI technologies may have an advantage in terms of teaching efficiency and quality, and students may achieve better academic results. Schools with fewer resources may not be able to provide adequate teaching and learning support, and students may not be able to realise their full potential, resulting in limited academic development. Schools with advanced technological support may provide more interesting and innovative learning experiences that stimulate students' interest and initiative. In resource-poor schools, students may face traditional and boring learning styles, resulting in reduced motivation.

3. Innovative Strategies of Artificial Intelligence Technology in Teaching English at the Basic School Stage

3.1 Increased Funding for Education

Increased investment in education is one of the most important strategies to address the infrastructure and technological problems of English language teaching and learning in basic period. Ensuring sufficient investment in education funding can provide schools with better teaching equipment and technical support, thereby enhancing the quality and efficiency of teaching. On the one hand, schools can actively seek the support of the government or schools for more education and technology funding for upgrading and improving school infrastructure. The government can increase its investment in education and provide more education technology subsidies to help schools purchase advanced teaching equipment and software, so as to promote the modernization of education. After obtaining education funding, schools need to plan and use it in a rational manner. The funds should be used to purchase teaching equipment and technology that suit the needs of the school, provide teacher training and professional support, and improve the teaching environment and infrastructure. Rational planning of the use of funds can maximise the teaching and management standards of schools and ensure the effective use of education funds.

On the other hand, if there are limited funds for education, lower-cost and easy-to-maintain devices can be chosen, such as using inexpensive smartphones or tablet PCs as teaching terminals.

These devices are usually cost-effective, can meet the most basic teaching needs of students and teachers, and are relatively inexpensive, making them suitable for mass promotion of their use in schools. Another example is the use of cloud computing services which can effectively solve the problem of data storage and processing. Through cloud computing, schools can store data in the cloud without the need for a large number of hardware devices, reducing equipment procurement and maintenance costs. At the same time, cloud computing also enables data sharing and collaboration, facilitating information exchange and learning interaction between teachers and students.

3.2 Provide Regular Training to Develop Complex Human Resources

For many teachers, AI technology may still be unfamiliar, so regular training is provided to cultivate composite talents in order to enhance the technological level and teaching ability of the English teaching force. Schools can organize regular educational technology training courses for teachers of different levels and needs. These trainings could include the application and operation of AI technology and how to integrate it into English teaching. The training content should be practical and relevant to help teachers better master the technological tools and improve their teaching effectiveness. The training can be provided by professional EdTech practitioners or technology companies with in-depth knowledge and practical experience in AI technology to impart the latest technological knowledge and pedagogical methodologies to teachers, and to help them better utilize AI technology in their teaching practice[10]. Schools can establish collaboration and exchange platforms among teachers so that experienced teachers can share best practices and techniques. Through interaction and learning among teachers, professional growth and technology enhancement can be promoted. At the same time, schools can also actively attract educators with technology background to join the education sector and enhance their technical support teams. These composite talents can provide teachers with more professional technical support and guidance, and help them solve problems and challenges in technology application.

3.3 Establishment of a Clear Data Privacy Policy

Protecting the privacy and security of students' data is crucial when applying AI technology, which involves students' personal data and privacy issues[11]. Therefore, the relevant authorities must expedite the formulation of clear data privacy policies to ensure the safe and legitimate use of student data. Technology developers can adopt solutions such as data desensitization and encryption technologies to protect students' personal information and prevent data leakage and misuse. At the same time, schools should proactively communicate with students and parents to explain the collection and use of data and obtain relevant authorization. Establish a transparent mechanism for data use to enhance students' and parents' trust in data security.

When collecting, processing and storing student data, it is important to follow relevant privacy protection laws and regulations, obtain explicit consent from students and their parents, and take security measures to protect the security of the data. Secondly, schools and teachers should ensure transparency and control of data when using AI technology. Pupils and parents should have a clear understanding of how their data will be used and have the right to control how their data is used. Schools and teachers should provide clear privacy policies and user agreements that explain the purpose and scope of data use and provide the right to choose whether or not to participate in relevant data collection and processing. When using AI technology, it may be necessary to store pupil data in the cloud or on third party service provider platforms. As such, schools and teachers need to ensure that they choose trusted data storage and processing service providers and enhance data encryption and protection measures to prevent data leakage and security breaches. At the same

time, schools and teachers need to engage in sensible data use and processing. Artificial intelligence technologies may perform large-scale data analysis and mining to provide individualized learning suggestions and recommendations for students. However, when using such data, schools and teachers need to follow ethical principles and should not use students' data for commercial purposes or to personally attack students[12].

3.4 Keeping Abreast of the Technological Frontier and Avoiding Blindly Following Trends

Artificial intelligence technology is constantly developing and updating, with new applications and tools emerging. Against this background, schools in basic period can set up a technology development planning team to keep a close watch on new developments in the field of education technology, assess the potential value of new technologies for teaching and learning in schools, and keep abreast of the technological frontiers while avoiding blindly following the trend. The Technology Development Planning Team, comprising members who are experts in education technology, teachers and administrators, is responsible for tracking the latest development and application trends of AI technology. Team members should have in-depth technology knowledge and teaching experience and be able to accurately assess the value and impact of new technologies on teaching and learning. Schools can also actively co-operate with technology companies to learn about the latest AI technology applications and assess their applicability in teaching, and obtain professional technical support and guidance to help them better apply the new technologies in their teaching practice. When promoting new technologies, schools can adopt agile development methods to gradually roll out and apply new technologies, avoiding over-investing in unproven technologies at one time. Through gradual testing and improvement, the advantages and shortcomings of new technologies can be better identified and the risk of promoting new technologies can be reduced. In introducing new technologies into teaching, schools should also focus on practical verification. Teachers and students can participate in the trial and evaluation of new technologies, collect feedback and opinions, and continuously optimise and improve the application of the technologies to ensure that they can truly meet the needs of teaching and learning.

3.5 Focus on Educational Equity and Promote Access to Technology

Educational equity is a core value of education, and the use of AI technology should not exacerbate educational inequity. Schools and governments should develop policies for universal access to education technology to ensure that all schools in a region have access to some level of AI teaching resources. This means that technology resources and support should not be limited to a small number of schools or developed regions, but should be universalized to all schools, especially those in remote areas. For schools with limited financial resources, subsidies or grants can be provided to promote the spread of technology. This can help these schools to purchase the necessary AI equipment and software, provide training and technical support, and ensure that they too can enjoy the advantages of AI technology adoption.

In promoting the use of AI technology, schools should pay close attention to the impact of technology applications on student learning outcomes and the quality of teaching and learning[13]. Ensure that the application of AI technology will not exacerbate educational inequity, but can provide better quality learning opportunities for all students. Schools can establish a monitoring and evaluation system to regularly assess the effectiveness of technology application. By collecting students' learning data and feedback, they can understand the strengths and weaknesses of the technology application and continuously optimize it to ensure that all students have access to equitable learning opportunities.

4. Reflections and Prospects

This study adopts a mixed-method research approach combining quantitative and qualitative methods. By means of a mixed-method research on a sample of 4085 students from School Q in J City, the specific application of AI technology in the English teaching in basic period is more comprehensively sorted out and analyzed. Through analyzing the data and conclusions drawn from the study, it is apparent that AI technology has achieved some progress in English teaching with great potential for application and development. Nevertheless, this study also uncovered some developmental bottlenecks, such as infrastructure and resource constraints, insufficient faculty and training, data privacy and ethical issues, slow iteration of technological updates and changes, unevenness of educational resources, as well as a lack of composite talents. These issues have affected the effectiveness and development of the application of AI technology in the English teaching in basic period to a certain extent.

In a nutshell, AI technology holds great potential for providing students with a more personalized and efficient learning experience in English teaching in basic period. Nevertheless, there are a series of dilemmas that need to be surmounted with a view to taking full advantage of AI technology. It is only by progressively addressing these issues that the application and healthy development of AI technology in English teaching in the basic period can be accelerated, and the fairness of education and the improvement of education quality can be facilitated. For this reason, the government, schools, teacher groups, technology developers, and other parties need to exert joint efforts and make continuous endeavors to make AI technology better integrated into English teaching in the basic period, so as to truly bring broader prospects for the development of education undertakings.

5. Conclusions

The study reveals that while AI technology has remarkable potential in enhancing English teaching during the basic education stage, its full integration faces notable challenges. Addressing bottlenecks—such as limited infrastructure, resource disparities, and concerns surrounding data privacy, ethical standards, and faculty training—remains essential to fostering AI's beneficial impact on education. Only through a collaborative approach among government bodies, educational institutions, teacher communities, and technology developers can we achieve meaningful, equitable improvements in educational quality and accessibility. With sustained efforts toward strategic funding, comprehensive training, robust data policies, and a focus on educational equity, AI can be responsibly and effectively embedded in English teaching, paving the way for a future where technology enriches the learning experience for all students.

References

[1] An Xin, Shen Xi, Zhou Ying, et al. The development of the integration of artificial intelligence and teaching from the perspective of English teachers: opportunities, challenges and enhancement paths[J]. Modern Educational Technology, 2023, 33(02): 71-79.

[2] Lin Xiaoling. Role orientation and professional development path of university English teachers in the era of "AI+Education"[J]. Journal of Qingyuan Vocational and Technical College, 2023, 16(01): 64-70.

[3] Qin Yurong. Exploring the Mixed Mode of College English Listening and Speaking Output with the Assistance of AI Technology[J]. Culture and Communication, 2022, 11(06):47-53.

[4] Zhu Han. Research on the Civics and Politics of University English Course Assisted by Artificial Intelligence[J]. Education Review, 2022, (11): 104-109.

[5] Junmei S, Hongliang M, Yu Z, et al. Promoting the AI teaching competency of K-12 computer science teachers: a TPACK-based professional development [J]. Education and Information Technologies, 2022, 28(2).

[6] Shi Linglong. Rethinking oral English teaching: how artificial intelligence (AI) can empower[J]. China Journal of Multimedia and Network Teaching (Zhongdian), 2022, (06):9-13.

[7] Deng Qinzhu, He Yingqi, Chen Yizi, et al. "Exploring the effectiveness of AI+Limited Immersion English Teaching in application[J]. Overseas English, 2022, (03): 191-193.
[8] Shao Mengqiu, Qin Jian, Zhao Xiaosheng, et al. Cultivation of English disciplinary literacy - a strategy based on the educational application of artificial intelligence technology[J]. China Medical Education Technology, 2021, 35(04): 437-442.
[9] Zou B, Wang M J. Artificial intelligence technology and English language teaching: current status and outlook[J]. Foreign Language, 2021, 37(03): 124-130.
[10] Sun Xing. Practical Research on Optimising the Online English Curriculum System of the Basic Academic Section under the Background of "AI+"[J]. English for Secondary Students, 2021, (20): 52.
[11] NetDragon Websoft Inc. NetDragon rolls out the world's first AI teaching assistant[J]. Journal of Engineering, 2018, 56.
[12] Hua Lulu, Chen Lin, Sun Mengmeng. Research on Artificial Intelligence to Promote the Change of English Learning [J]. Modern Distance Education, 2017, (06): 27-31.DOI:10.13927/j.cnki.yuan.2017.0054.
[13] Wang Feihong, Wang Zhiwen, Sun Yuke. A preliminary study on the application of intelligent chat for English dialogue learning[J]. Foreign Language E-Learning, 2004, (04): 67-71.