# A Discourse on Innovation of English Teaching in China from the Perspective of Artificial Intelligence

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**Abstract**

With the progression of economic globalisation, China's expectations about the quality of English teaching in the country have increased, and because of the restrictive drawbacks of orthodox English teaching models, they cannot meet these requirements. The emergence of artificial intelligence (AI) technology can create new opportunities for the optimisation of English teaching. As such, this study aims to systematically review and analyse the current research on the innovations afforded by AI for China's English teaching model, especially the application of AI in unquiesced English teaching. The descriptive–analytical approach is used to study and analyse the literature. The research results highlight evidence of success cases, illustrating that the implementation of AI in English teaching in China can provide new ideas and create new spaces for the innovation of teaching models.

Keywords: artificial intelligence; English teaching in China;  innovation in English teaching

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## 1. Introduction

English teachers have shifted to the use of rich audio, video and text resources to teach. In the same vein, online education platforms also provide many English course resources. It can deepen and process knowledge through big data, intelligent calculations and help teachers choose resources and materials. Big data and cloud platforms can provide teachers with selected teaching materials, which significantly saves teachers' lesson preparation time and improves their work efficiency. Moreover, artificial intelligence technology can also help teachers understand students from different aspects, allowing teachers to make more accurate judgments on students' learning progress and abilities (Lin, Ying, Mengmeng, 2017).

Virtual reality teaching model can enhance the teaching and learning experience. It can enhance their actual learning experience and gain a learning experience that cannot be obtained only in the classroom (Weijuan, 2019). The evaluation of English learning can be generated intelligently by the AI system. It can detect and evaluate students purposefully, and it can take into account the learning progress and habits of all students. It is a fair evaluation.

Relying on big data, AI technology can track and record students' learning situation in and after class, and analyze their studying, behavioral characteristics and interest preferences (Zixing, 2016). In this way, students' learning style, learning efficiency and the reserve of basic knowledge can be accurately judged, thus forming a foreign language acquisition database for students.

Teachers need to innovate their teaching ideas. It is necessary to realize the importance of the application of ARTIFICIAL intelligence technology in English teaching. AI can provide English teaching with diversified resources, personalized education methods and intelligent teaching management mode (Aichun, 2019). It is important for teachers to change the teaching process. Teachers can set teaching tasks according to the teaching content and collect relevant video and audio materials before class. In teaching, the human-machine interaction is used to arrange, adjust and modify the data and information recommended by the intelligent platform.

When integrating artificial intelligence and education becomes deeper and deeper, teachers should break away from the traditional, outdated single teaching mode (Rong, 2018). Facing the era of artificial intelligence, teachers cannot turn a blind eye to new technologies, nor can they be too nervous and afraid. A clear and complete understanding of the application model of artificial intelligence in foreign language teaching can better enable artificial intelligence to complete teaching tasks as a teacher's assistant.

Teachers will no longer be the focus of the class, but become the instructor, motivator, evaluator and facilitator of student learning (Aichun, 2019). Teachers no longer simply explain vocabulary and grammar, but choose a topic, let students use modern information technology, use the true English, science and sociology, pay attention to current affairs, read relevant English materials, and express and discuss their understanding of this topic. English teachers will become assistants to direct students instead of being the only authoritative person in the classroom. The teacher-student relationship is more friendly and equal.

### 1.1. Related research

The concept of AI, a branch of computer science, was first proposed by MckCarthy, Minsky, Lochester and Shannon in 1956 (Linwang, 2019). It seeks the production of new methods, similar to

human wisdom, by analysing the essence of intelligence, and it is regarded as one of the core technologies vital to promoting social progress. AI integrates multiple disciplines, including computer science, cybernetics, information theory, biology, linguistics and psychology, and it allows for new technologies such as deep learning, cross-industry integration, open intelligence and autonomous control features (Aichun, 2019).

In recent years, as AI has gradually entered a new era (Cyberspace Administration of China, 2017) with the assistance of deep learning technology, AI has made rapid breakthroughs in various fields, such as economy and education (Horizon Project, 2017, p. 3). Currently, as indicated by Fang (2018, p. 3), the intersection of 'artificial intelligence + education' is one of the most salient topics in academia and research.

In 2018, the Ministry of Education of China proposed in the 'Innovative Action Plan for Artificial Intelligence in Higher Education Institutions' to accelerate the innovative application of AI in the field of education and to use intelligent technology to promote the establishment of an intelligent, networked, personalised and lifelong education system (Ministry of Education of China, 2018). In 2019, the 'International Conference on Artificial Intelligence and Education, Planning Education in the AI Era', held in Beijing, adopted and released the world's first international consensus on AI and education, called the 'Beijing Consensus on Artificial Intelligence and Education'. The consensus was the first document in history to provide guidance and suggestions about the scientific use of AI technology, with the goal being to implement the guidance in the 2030 Education Agenda. Through this document, the systematic integration of AI into education is expected to solve major challenges in the education field and to produce innovative teaching practices (International Conference on Artificial Intelligence and Education, Planning Education in the AI Era, 2019).

The integration of AI and education is bringing new hope and a new direction to the development of education, as it is being used to create a new educational ecology and to prompt new ideas for updating English education models. Modern English education has begun to be transformed into a cohesive system that is more intelligent, unquiesced and precise. There has also been an increasing amount of research on AI in education in recent years (Rong, 2018), including topics ranging from robotics learning (Yueka, 2019) to deep learning (Lu, 2016) to personalised learning.

Globally, many technology companies have also made attempts to integrate AI and education. For example, Nuance, located in Massachusetts in the United States (US), makes speech recognition software that students and faculty can use. The technology can transcribe up to 160 words per minute and is especially helpful for students who struggle with writing or have limited mobility. In addition, a platform by Century Tech—based in London in the United Kingdom—utilises cognitive neuroscience and data analytics to create personalised learning plans and to reduce workloads for instructors. Carnegie Learning, which is based in Pittsburgh, Pennsylvania, US, uses AI and machine learning to help students develop a deeper conceptual understanding of mathematics. Finally, China's iFLYTEK and Shanghai E-education Technology etc., is a symbol of a start-up that is attempting to build a production line of AI and smart products in the field of education.

The authors believe that educators should keep pace with the new developments in the field and stay up to date with current trends in English teaching, including the use of AI. They should also be aware of the various functions of AI technology that can be used to innovate the current English teaching methods. As such, through this literature review and, as described in the following section, interviews with frontline English teachers, this study attempts to determine the main English

teaching modes used in China, the advantages of implementing AI in unquiesced English teaching and suggestions for its successful application.

### 1.2. Purpose of study

As an essential product of modern technology, artificial intelligence (AI) has achieved breakthroughs in many fields in recent years, such as natural language understanding and image recognition. Although AI technology can be efficiently integrated with English teaching and learning, its effects in this context have not yet been fully researched or understood. As such, this study aims to systematically review and analyse the current research on the innovations provided by AI for China's English teaching model, especially the application of AI in unquiesced English teaching. To achieve this aim, the following research questions (RQs) were posed prior to the systematic literature review:

RQ1: Which forms of AI are used to provide innovations within English teaching in China?

Multimedia technology, VR technology, Applications on mobile devices, intelligent classroom, intelligent robots etc., are being used in English teaching

RQ2: What are the advantages of implementing AI in English teaching in China?

RQ3: What are the recommendations for the successful application of AI within unique is used English teaching?

## 2. Methods and Materials

### 2.1. Data Collection

To find the answers to the identified RQs, a systematic literature review (Tranfield et al., 2003) and interviews were used. To conduct the literature review, the Chinese National Knowledge Infrastructure (CNKI), Wanfang Data, Web of Science and EBSCOhost electronic databases were searched for relevant articles published between 2011 and 2021.

### 2.2. Data collection procedure

The search terms used were 'AI for foreign language teaching', 'AI for unquiesced English teaching' and 'advantages of AI in English teaching'. In addition, in early March of 2021, the authors searched publications in the 'education/educational research' category of the CNKI, Wanfang Data, Web of Science, and EBSCO host electronic databases, published from 2017 to 2021, using substrings of the following keywords: 'AI (artificial intelligence)' and 'English teaching and learning'. Many relevant articles were identified through this search.

Next, the obtained studies were screened by title and abstract, ensuring that they held some relevance to the following topics: English artificial intelligence or virtual reality applications; English teaching and learning strategies, modes or models; big data; natural language processing; intelligent tutors (Zawacki-Richter et al., 2019); or neural networks. In total, 480 articles were obtained from CNKI, Wanfang Data, Web of Science, and EBSCO host electronic databases, and after excluding non-article publications, 341 articles were retained. Following that, a manual review was conducted to examine the content of each article (including the paper title and abstract) to eliminate repeated articles, literature reviews and irrelevant publications, to ensure that the selected articles involved the use of AI in practical English learning activities. Finally, 81 articles were retained for content analysis. See Figure 1 for an overview of the article identification process.

## 3. Findings

### 3.1. Article selection process for systematic literature review
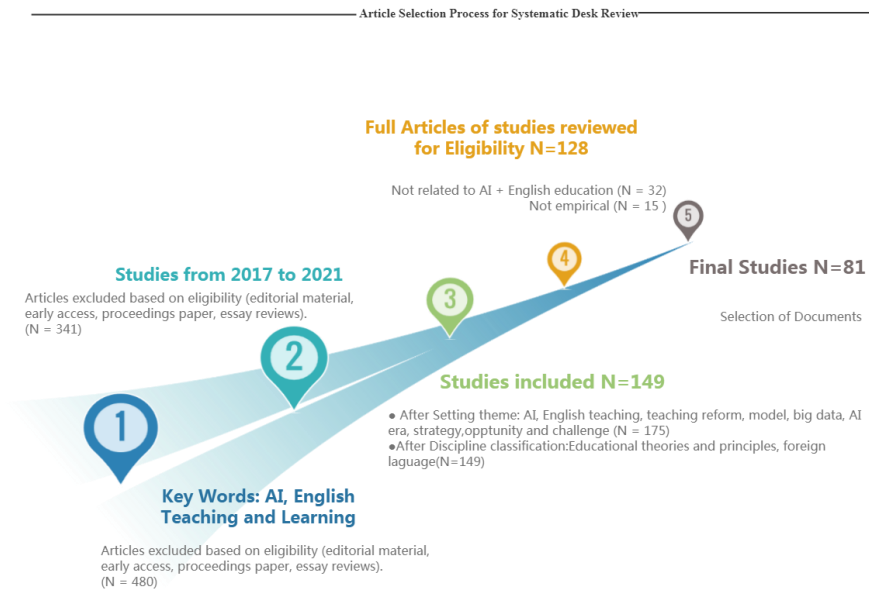


**Figure 1.** Article selection process for systematic literature review.

### 3.2. Findings from selected literature

Based on the above literature review and analysis, it is clear that the application of AI technology in English teaching has a significant impact on improving teaching efficiency, on changing the mode of teaching and on the evaluation, systems used, among other things. The articles identified during the literature review came from both Chinese and foreign journals, including the *Journal of Distance Education*, the *Journal of Modern Educational Technology*, the *Journal of Electrified Education*, *Computers & Education*, *Teaching and Teacher Education* and the *International Journal of Artificial Intelligence in Education*, and from master's and doctoral theses. The articles were published in the CNKI between 2017 and 2021. The authors searched for relevant articles.

After excluding the invalid literature, 81 articles from China and elsewhere were identified, as shown in Figure 2. It can be seen that the number of articles published in China, while increasing initially, has decreased since 2019. The number of articles published on the subject in other countries fluctuates greatly. Generally speaking, the topic of AI and English teaching is not hugely popular in academia, either at home or abroad.
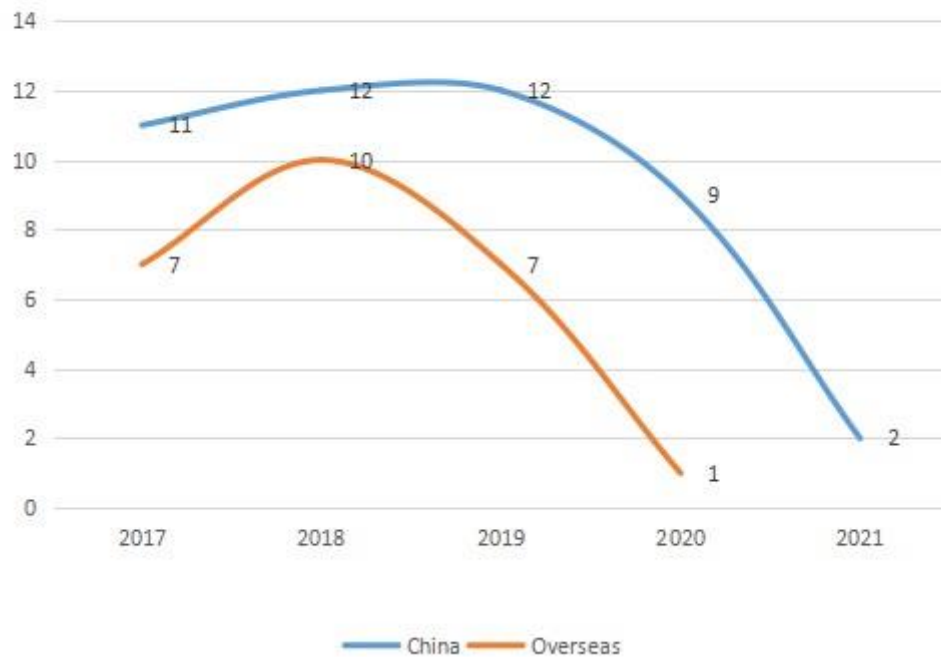
*Figure 2.* Comparison of articles on 'AI' and 'English education' at home and abroad in the past five years.

AI technology can deeply process knowledge through big data and intelligent calculations, and this can be applied to help teachers choose resources and materials. Big data and cloud platforms can provide teachers with selected teaching materials, which can save teachers time on lesson preparation and improve their work efficiency. Moreover, AI technology can help teachers understand students from different perspectives, allowing teachers to make more accurate judgments of students' learning progress and abilities (Lin, Ying, Mengmeng, 2017).

With the support of data, teachers can better formulate teaching plans and content, match teaching goals with students' actual abilities and effectively improve their teaching efficiency.

China's modern society needs comprehensive talent with a clear awareness of the need for innovation and unique characteristics However, teachers don't have enough energy to pay attention to the unique learning habits and needs of every student in a large class. An AI education system resolves this conflict (Lulu, Chen, Mengmeng, 2017). Based on big data, AI technology can track and record students' learning in and after class and can analyse students' daily performance, behavioural characteristics and interest preferences. In this way, accurate judgments can be made about students' learning styles, learning efficiency and primary knowledge reserves. According to this, a database of students' second-language acquisition can be formed.

A virtual reality teaching model can also enhance the teaching and learning experience. The application of AI in English teaching can improve the sense of language empathy. Using AI-based virtual technology, students can quickly enter the world of virtual reality to enhance their actual learning experience and gain a learning experience that could not be obtained only in the classroom. Students can shed the shackles of classrooms and standard teaching materials to experience a more

three-dimensional and natural language environment (Li, 2020), making second-language learning more rich, comprehensive and multi-angled.

Following the joint use of AI and VR, evaluations can be generated intelligently by the system using big data, and students can be purposefully examined, allowing the learning progress of all students to be taken into account. This is a fair evaluation method and model. In addition, the use of AI detection and evaluation can reduce teachers' workloads, enabling educators and teachers to focus on teaching, innovating and conducting additional research on scientific teaching methods.

The teacher-led teaching method allows teachers to have control over the content of their classes, and taking the average level of the students as the reference point for developing the teaching content and objectives generally ensures that the content is accessible to most students. However, precise teaching cannot be realised according to each student's unique English ability. The unification of the teaching content and objectives represents an 'assembly-line production' mode of English teaching, in which students cannot be taught according to their unique aptitudes, and personalised learning and development cannot be realised. Moreover, the orthodox English teaching model cannot achieve the goal of cultivating comprehensive talents with innovative consciousness and distinctive individuality (Lu, 2016). See Table 1 for a comparison of conventional and AI-integrated teaching.

**Table 1.:** *A brief comparison of English teaching models.*

| Types | Conventional English Teaching | Integration with AI |
|---|---|---|
| Presentation | Only the content that teachers can teach in real time can be presented. | It can not only present the real-time teaching content, but also display various multimedia resources and live Jump classroom atmosphere. |
| Dealing with teaching content | Write or modify in a fixed position with a pen according to the content of the lecture. | It not only has the presentation function, but also can modify and label the presentation content and save it in time. |
| Interaction | Teachers and students can show their ideas in the classroom, but there are few opportunities. | There are various forms of teacher-student interaction, which can be carried out on a variety of equipment in or after class. |
| Save and review content | It can only be saved in this class and cannot be restored after erasing. | It can be saved and reviewed in any form as needed. |

## 4. Discussion

This study analysed 81 articles published between 2017 and 2021, most of which demonstrated that the use of AI technology has great potential for promoting teachers' English teaching efficiency and students' learning performance. In addition, using AI technology to diagnose students' learning problems can provide not only instant feedback to unique students but also information to help teachers improve the learning design used in their classrooms (Bywater et al., 2019). From the analysis results, the following findings and implications were derived.

The most research in this area was published in the journals of major normal universities, such as East China Normal University and Northeast Normal University, followed by journals such as *Campus English* and *Overseas English*. Among them, materials and resources from master's and doctoral thesis databases accounted for the most articles, with papers from educational, technology and academic journals ranked second and reference materials from international conferences ranked third. In other words, most researchers focussing on AI and English teaching are engaged in education, teaching, learning and research, which means that English education researchers need to be encouraged in their research and should consider integrating AI technology into their own English teaching.

From the results of a cluster analysis of the keywords, there are three clusters present in the related research: 'learning modes based on AI, 'personalised learning' and 'learning strategies/models/applications.' In addition, a small part of the literature focusses on the field of psychology, such as the challenges currently facing English teachers after the integration of AI, as well as the changes it causes in the relationship between teachers and students. These will be highly significant for the practical application of AI in English classrooms in the future.

The most commonly used sample group in numerous data and studies is middle school students, followed by college students and elementary school students. This may be because the difficulty of junior high school English is between high school English and primary school English. Moreover, the language plasticity of junior high school students is stronger than that of senior high school students, without the pressure of the college entrance examination. In addition, most studies have focused on comparing students' English performance (scores) after AI was applied to English teaching. The author analyzed that this is because in China, students' grades are the most intuitive evaluation criteria. Results can judge whether a teaching method is effective or not (Horizon, 2017; Tao, 2018).

The most common role of AI in education is acting as an intelligent teaching system and auxiliary platform, followed by assisting with evaluation, prediction and providing an adaptive system and personalisation. The main purpose of developing the integration of AI and English teaching is to use big data to analyse students' learning situations, evaluate their problems in learning English, identify their learning interests and preferences, and provide them with immediate support through the results of the above analysis (Aichun, 2019). The goal of this process is to improve students' English learning achievements. Although adaptive learning systems and personalised learning have the same goal, developing such adaptive learning systems is more challenging, so relatively few studies have been done on the topic to date.

Most studies evaluated in the literature review investigated students' academic achievements (cognitive dimension) and learning motivations and attitudes (emotional dimension). This is because, in the era of AI, the importance of cultivating students' high-order cognitive ability will become more prominent (Wang et al., 2020). In addition, because English is taught as a foreign language in China and its writing system, language and cultural background are very different that of Chinese, students generally believe that the English curriculum is very challenging; as such, students' learning motivations and attitudes towards English are also a hot research topic.

At present, the English teaching model adopted by most schools is based on teachers' own teaching preferences, with multimedia equipment being used as teaching aids (Wang et al., 2020). This is the easiest model for obtaining high scores under exam-oriented education, as the appropriate use of multimedia equipment is conducive to cultivating a learning-focussed atmosphere in the classroom.

However, it also has many disadvantages. If only rely on multimedia technology and continue to use the certain classroom as the only place for teaching, English teaching will limit the interaction and initiative of teaching.

## 5. Conclusions

To sum up, the diversity of the research related to the integration of AI and English teaching makes it possible and will bring many benefits and advantages to English education and teaching in China. It would be valuable, in future, to research and develop adaptive English teaching environments via the integration of and collaboration with AI.

This literature review has shown that, with the development of science and technology, the integration of AI and English teaching has now become a necessity. As the traditional teaching model is replaced, the new model of integrating AI with education will be used to meet the development needs of China's society. Educators should adapt to this change by actively seeking to apply AI in their own teaching to improve their teaching standards. For example, it could be valuable to adopt relevant AI applications in the learning activities of advanced English programs, such as English speaking, listening and writing courses. It is also important to consider how AI applications benefit all groups involved in English education in China, especially teachers and students in rural areas, which often lack high-quality teaching and learning resources, as well as small groups, such as senior high school teachers and students.

In order for students to have better self-development in the future, teachers should use the in-depth integration of AI and English teaching to stimulate students' learning enthusiasm, cultivate their autonomous studying habits and develop their ability to think independently and innovatively, as well as focussing on improving their second-language communication skills.

Teachers should break away from the traditional, outdated single mode of teaching and actively accept and adapt to the information-based and intelligent mode of teaching. In the era of AI, teachers cannot ignore new technologies, nor can they refrain from using them because they are too nervous or afraid. A clear and complete understanding of how AI can be applied in second-language teaching can help enable teachers to use AI to complete teaching tasks and act as a teaching assistant.

It will also be important to investigate the effectiveness of using AI in English teaching activities from different perspectives by taking into account areas of research that are rarely considered, such as cognitive load, collaboration and communication competencies, and learning anxiety. It could be interesting to employ modern AI technologies, such as image recognition and voice recognition, which might be directly relevant to English teaching content. Such technologies could benefit learners in other ways, too, such as in the areas of deep learning and self-evaluation, providing a platform for students to be supported in their independent learning.

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