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Exploration on the Application of Large Language Models in Chinese Teaching

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Abstract: Large language models (LLMs) generated based on artificial intelligence technology have accelerated the innovation of Chinese teaching models and field reforms, and promoted the global promotion of Chinese teaching. Against this backdrop, Chinese teaching should keep pace with the times, focus on the new trend of smart education, and rely on large language models to construct classrooms featuring "human-intelligence collaboration," "resource integration," and "personalized customization." Embedding large language models into Chinese teaching and designing intelligent classroom assistance systems can lead to a new trend of "language + skill" learning, promote the integrated development of digital and intelligent technologies with the supply and demand of Chinese culture, and further improve the quality and efficiency of Chinese teaching. Based on this, this paper analyzes the theoretical foundation for constructing Chinese teaching classrooms with large language models, the teaching application scenarios of large language models, and new considerations for improving Chinese teaching in the AI era, aiming to highlight the empowering advantages of large language models and advance the digital transformation of Chinese teaching.

Keywords: Large language models; Chinese teaching; Application exploration

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1. Introduction

Empowered by artificial intelligence technology, the innovative applications of large language models such as ChatGPT in Chinese language teaching have led to a development trend characterized by diversification, multiple participants, and multiple modes. This has facilitated personalized language learning, human-machine communication across time and space, as well as the co-construction and sharing of Chinese language education platforms and data resources. With technological innovation and progress, large language models' anthropomorphic features and modal interaction functions have become increasingly prominent. This has gradually subverted the traditional Chinese language teaching construction model, which was teacher-led and learner-centered within the scope of traditional teaching, causing a shift in the role positioning of Chinese language teachers. Therefore, Chinese language teaching should strive to adapt to the new educational ecosystem of the artificial intelligence era, attach importance to giving full play to teachers' subjective initiative, and thereby

promote the intelligent dissemination of Chinese language and Chinese culture based on constructing a new pattern of human-intelligence collaborative development.

2. Theoretical foundation

2.1. ChatGPT: a representative of large language models

The ChatGPT model, developed using Reinforcement Learning from Human Feedback (RLHF) technology, stores vast amounts of knowledge data. It can generate textual answers by retrieving knowledge and integrating data based on human questions, and continuously produce high-quality and high-level content guided by manual feedback calibration, thus achieving an organic interaction between humans and the generation of new texts. As an intelligent assistant for humans, ChatGPT can assist them in efficiently completing various text tasks. For the development and innovation of Chinese language teaching, ChatGPT can provide comprehensive teaching services and resource support, offering high-quality and abundant language resources and introducing online communication and interaction platforms. ChatGPT can also generate personalized teaching evaluations and feedback guidance according to the teaching process, enabling teachers to have a better understanding of their teaching proficiency and students to have a better grasp of their language learning level [1].

2.2. Teachers' digital literacy

Artificial intelligence drives the high-quality development of education but does not undermine teachers' principal role in educating people or change the essence of Chinese teaching. Teachers are a crucial pillar supporting the high-quality development of Chinese teaching. Although AI cannot replace teachers as the main body of education, teachers who can use AI technology have greater potential for career development than those who cannot. In November 2022, the Digital Literacy for Teachers issued by the Ministry of Education clearly defines the framework dimensions of teachers' digital literacy: digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development. Overall, Digital Literacy for Teachers indicates that in the AI era, teachers should have the awareness to continuously learn digital technologies and actively use intelligent technologies to implement personalized teaching. In this regard, Chinese teachers should actively understand and pay attention to the latest advancements in AI technologies and large language models in the fields of Chinese language and language education, grasp the essence of the integrated development of large language models and Chinese teaching, so as to identify the application positioning of large language models in Chinese teaching and effectively exert their own initiative [2].

2.3. Constructivist teaching design concepts

Constructivism emphasizes that learners can acquire knowledge through meaningful and valuable subjective construction with the help of teachers and peers, and by utilizing appropriate and necessary learning resources within a specific learning environment. Therefore, the core elements of constructivist teaching design concepts are context, collaboration, conversation, and meaning construction. When using large language models for teaching design, Chinese teachers should consider students' meaning construction of the learning content and digital resources, create appropriate human-computer interaction contexts around large language models, and guide students to complete task-based learning and practical inquiry through collaboration and conversation. Collaboration and conversation can deepen students' understanding of the learning content and classroom resources, prompting them to construct the internal laws of language learning.

Meanwhile, constructivism emphasizes that teachers should play a guiding role in helping students complete meaning construction, rather than merely mechanically imparting knowledge. This theoretical perspective aligns with the International Chinese Teacher Professional Competency Standards, both of which emphasize leveraging students' subjective initiative in Chinese teaching, guiding them to actively complete self-constructed meaning, and develop thinking abilities and knowledge systems [3].

3. Application scenarios of large language models in Chinese teaching

3.1. Human-machine collaborative questioning: strengthening reading comprehension

Self-questioning helps improve learners' concentration, deepen their understanding and thinking of Chinese language content, and enhance the effectiveness of Chinese language teaching. However, at the current stage, Chinese language learners generally have problems such as low question-asking proficiency and a single type of question. Therefore, teachers can leverage the natural language generation advantages of large language models like ChatGPT and T5-PEGASUS to create high-quality questioning scenarios for Chinese language learners. The T5-PEGASUS large language model provides Chinese language learners with the question co-creation tool "Co-Asker," which can not only boost learners' enthusiasm for asking questions but also generate answers and new questions by integrating resources and content from the corpus based on question clues [4]. The teaching process of promoting human-machine collaborative questioning using large language models is as follows: first, select appropriate course learning content according to the learning level of Chinese language learners. For example, choose content that meets the daily communication needs of Chinese language learners around the Chinese Proficiency Scales for International Chinese Language Education, and integrate practical learning topics and content, such as introducing family information, study arrangements, seeking medical treatment, etc. These topics cover the basic life situations of Chinese language learners, enabling them to obtain the most direct and effective resources in language learning and helping them deeply understand Chinese social norms and cultural customs. Second, upload the above resources to an online reading platform, and require learners to read the study materials and raise questions based on the central idea and thematic content of the articles. Finally, encourage learners to use Co-Asker to assist in question generation and conduct a comparative analysis with the questions they independently created, or engage in human-machine debates with Co-Asker around the independently created questions, thereby constructing deeper-level questions from shallow-level ones. This enables Chinese language learners to establish connections between textual materials and prior knowledge and construct a new knowledge system on this basis.

3.2. Human-machine collaborative writing: enhancing writing proficiency

Writing is a difficult and key part of the field of Chinese language teaching. Chinese language learners commonly face problems such as "unwillingness to write", "lack of ideas for writing," and low efficiency of traditional teaching guidance. Large language models like ChatGPT and T5-PEGASUS have unique content creation and real-time multilingual translation functions. They can generate meaningful responses based on questions and are suitable for different language teaching models. These models are of great help in reducing the cognitive barriers of Chinese language learners during second-language writing and providing them with an excellent language application environment. Therefore, during the teaching process, Chinese language teachers can adopt more flexible teaching methods according to the individual differences and actual needs of learners. In writing training courses, the application of GPT-4 has greatly improved the "operability" of language training. It can

conduct multimodal interactive processing of graphic information and provide Chinese language learners with a personalized learning environment that integrates "vision-text-semantics" from a visual perspective. For example, considering the complexity of Chinese language teaching targets, tutoring teachers usually implement teaching according to the levels of the Hanyu Shuiping Kaoshi (HSK, Chinese Proficiency Test). However, this teaching strategy inevitably has a performance-oriented tendency that focuses on learning outcomes. Therefore, introducing GPT-4 into writing training and building interactive writing training scenarios around word and phrase querying, picture composition, word-group writing, etc., can effectively stimulate the writing interest of Chinese language learners and improve their Chinese application ability [5].

Human-machine collaborative writing can provide Chinese language learners with guidance on argumentative, creative, and critical writing styles. Therefore, in addition to introducing the GPT-4 large language model, Chinese language teachers can introduce different writing training models according to the teaching content. For example, for argumentative writing, the large language model BART has significant advantages and can generate content with good readability and fluency. At the same time, the content created by this model can be automatically evaluated and fine-tuned using the large news dataset CNN-DailyMail, and the richness of ideas and the richness of text content can also be tested through manual evaluation. In addition, GPT-3 can assist Chinese language learners in creative and critical writing to achieve human-machine collaborative writing. That is, learners first complete the draft writing based on the prompts of the language model, and then refine it according to the writing suggestions and revision opinions provided by the model [6].

3.3. "Hyper-anthropomorphic" AI tutor: reshaping the teaching ecology

In 2024, the innovative launch of the "Doushen AI" edge-model integrated educational product has facilitated the reshaping of the language and literature education ecosystem. "Doushen AI" achieves deep integration of large language models with client terminals, focusing on the practical challenge of difficult implementation of "teaching according to aptitude" under the traditional teaching framework, which can effectively enrich the learning experience of Chinese language learners. Building a knowledge graph is the key and core of developing artificial intelligence technology [7]. Relying on the GraphRAG technical framework and approach, "Doushen AI" can encapsulate and delimit Chinese teaching materials, thereby constructing a huge knowledge graph on this basis. At the same time, with the technological progress and innovation of the Doushen AI content production platform, the fifth-generation content production platform can effectively eliminate the AI traces of text generated by large language models, making the content more rigorous and maintaining emotional warmth.

In the traditional "one-to-many" Chinese language classroom, it is difficult for teachers to attend to every student. However, the "Doushen AI" hyper-anthropomorphic tutor can create different digital avatars, build a unique language learning environment for each Chinese language learner, and conduct intelligent interactions with them through voice algorithms [8]. Currently, existing online education products on the market generally face the problem of difficulty in implementing "teaching students according to their aptitudes." For example, homogeneous content provision ignores the individual differences of learners, and relatively rigid evaluation systems limit the development of learners' thinking. The extensive application of the "Doushen AI" hyper-anthropomorphic tutor in the field of language education has gradually broken through the above limitations. It can flexibly integrate and supplement language materials according to the actual needs of learners, rather than just providing simple pre-made content. Compared with traditional education, this innovation is revolutionary. In Chinese language learning, it can provide customized learning plans based on students' specific situations, helping them better master reading skills and Chinese language learning methods [9].

3.4. Automatic generation of teaching feedback: optimizing teaching evaluation

Acquiring and applying teaching feedback is a crucial guarantee for improving the effectiveness of Chinese teaching. It helps teachers adjust teaching strategies, optimize teaching processes, implement personalized instruction, and meet the diverse needs of Chinese learners by providing accurate teaching evaluations [10]. For example, ChatGPT can collect various feedback data from learners during the teaching process, assisting teachers in making more informed decisions. Traditional teaching evaluations rely on manual labor, which is time-consuming and labor-intensive. Optimizing teaching evaluations through large language models (LLMs) can significantly improve evaluation efficiency and complete evaluation tasks more effectively. When LLMs are applied to Chinese teaching evaluations, they can capture learners' emotional changes and generate comments based on basic information such as interaction frequency, study duration, and learning frequency. Compared with traditional evaluations that highly depend on teachers' subjective judgments, the feedback data generated by LLMs is more objective, significantly enhancing the effectiveness of teaching evaluations [11].

4. Reflections on large language models and Chinese teaching

4.1. Rediscovering teachers' roles in the AI era

The application of large language models in Chinese language teaching fully demonstrates the coordinated cooperation between humans and artificial intelligence technology, as well as the integration of their respective advantages. The 2023 Global Education Monitoring Report: Technology in Education: Who's in Charge? deeply reflects on the role of artificial intelligence technology in the field of education, clearly pointing out that artificial intelligence technology has promoted profound changes in education and teaching. However, technology and education are not substitutes for each other. Artificial intelligence has promoted the diversified development of Chinese language education and also set higher requirements for teachers' wisdom literacy and digital literacy in human-machine integration. In the era of artificial intelligence, Chinese language teaching will be jointly undertaken by teachers and large language models. Teachers who understand technology and artificial intelligence will gradually replace those who do not, and the traditional teaching model centered around teachers, which focuses on "imparting knowledge, teaching skills, and resolving doubts," will evolve into a human-machine collaborative working model. Based on this, new forms of intelligent teaching and smart learning will be formed [12].

The integrated development of large language models and Chinese language teaching emphasizes the wisdom sharing between humans and machine models, with the focus on highlighting the empowerment of digital intelligence. This has profoundly influenced the teaching concepts, ability structures, and working methods of Chinese language teachers, providing them with digital and intelligent tools for resource integration, teaching design, and teaching feedback. However, at the current stage, there is a lack of relevant training to enhance the digital literacy and digital skills of Chinese language teachers, making it difficult for them to effectively address new challenges and situations in the context of the artificial intelligence era. As indicated in Artificial Intelligence and Education: A Guide for Policy-makers, "Far less attention has been paid to enhancing and improving teachers' digital literacy and digital skills than to the development of artificial intelligence for students." Therefore, in order to adapt to the new trend of human-machine collaborative development in the field of education in the context of the artificial intelligence era, as well as the transformation of teachers' roles from knowledge transmitters to learning facilitators, teachers should follow the digital and intelligent transformation of education. Through high-quality digital and intelligent technology training, they should continuously enhance

their new professional capabilities based on human-machine collaboration and effectively integrate digital and intelligent technologies such as large language models into daily teaching practices [13]. Incorporating digital literacy and digital skills into the professional development of Chinese language teachers and paying attention to the gap in digital access and usage among educational subjects can inject strong impetus into the construction of intelligent Chinese language classrooms, create a new ecology of intelligent education, and thus achieve harmonious interaction among "teachers-machines–students."

4.2. Emphasizing emotional education

The core of large language models is intelligent algorithms, making them rational technical tools. Therefore, during the application of large language models, Chinese language teachers should attach importance to teaching innovation in aspects such as emotional education, personality development, and cultivation of creative thinking [14]. For example, teaching design assisted by ChatGPT shows many deficiencies in meeting the individual needs of learners and creating interconnected scenarios for each teaching link. This is mainly because large language models have difficulty fully grasping the complexity of educational theories and are unable to make detailed adjustments in combination with specific learning environments. Moreover, the operation of ChatGPT highly depends on various data models and intelligent algorithms, and creating Chinese language teaching scenarios with unique artistic conceptions may exceed its capabilities, thus affecting learners' understanding and comprehension of Chinese language meanings. Therefore, the realization of high-quality Chinese language teaching relies on teachers' professional knowledge and experience, and it is still necessary to give play to their subjective initiative. This means that the application of large language models in Chinese language teaching mainly serves an auxiliary role and is by no means a substitute for teachers [15].

5. Conclusion

Large language models have huge application potential in Chinese language teaching and can assist teachers in optimizing teaching designs, which is highly beneficial for promoting teachers' digital and intelligent transformation. In this regard, Chinese language teachers should be wary of the influence of the "technology supremacy" ideology, and conduct secondary revisions of the teaching designs generated by large language models. They should screen and revise the output results by combining their professional knowledge and teaching experience, so as to meet the diverse needs of different learners and promote collaborative innovation between humans and technology.

Disclosure statement

The author declares no conflict of interest.

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