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Article

Research on Resource Development and Teaching Model Construction of Chinese Cultural Education Assisted by Generative AI

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Abstract: This study focuses on the transformative application of generative artificial intelligence (AI) within the domain of Chinese cultural education, systematically exploring its pivotal role in both teaching resource development and the construction of advanced pedagogical models. As digital transformation reshapes global educational paradigms, integrating cutting-edge AI technologies becomes essential for modernizing cultural instruction. Through comprehensive theoretical analysis and rigorous practical exploration, this research identifies the core mechanisms by which generative AI facilitates dynamic content generation, personalized learning support, immersive cross-cultural interaction, and objective teaching evaluation. In response to the prevailing challenges currently hindering Chinese cultural education—such as highly fragmented learning resources, limited opportunities for student personalization, single-dimensional cultural presentations, and an increasingly heavy administrative workload for educators—a series of multidimensional optimization paths are strategically proposed. These comprehensive solutions encompass the intelligent development of multimedia resources, the implementation of innovative and adaptive teaching models, targeted initiatives for teacher capacity enhancement, and robust sustainable development strategies tailored for long-term educational resilience. Ultimately, this study provides profound theoretical insights and actionable practical guidance for educators and policymakers. By leveraging generative AI, institutions can significantly improve overall teaching effectiveness, actively promote continuous educational innovation, and substantially enhance the depth and breadth of cross-cultural communication in an increasingly interconnected global landscape.

Keywords: generative ai; cultural education; resource development; teaching models; educational innovation

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1. Introduction

1.1. Research Background and Significance

The rapid advancement of artificial intelligence has led to significant developments in generative AI, which is increasingly influencing the field of education by introducing innovative approaches to language and cultural teaching. Chinese cultural education, as a vital component of cross-cultural education, plays a dual role in fostering language proficiency and imparting cultural knowledge and values. Despite its importance, traditional methods of teaching Chinese culture encounter several obstacles, including the scarcity of comprehensive teaching materials, fragmented resources, limited adaptability to individual learning needs, and reliance on single-mode cultural presentations. Generative AI offers transformative solutions to these challenges through its capabilities

in efficient content generation, intelligent interaction, and personalized recommendations [1, 2]. By leveraging these technologies, educators can create more engaging and tailored teaching resources, thereby improving learning outcomes and student participation. Furthermore, the integration of generative AI into educational practices supports the broader goal of digital transformation in education, paving the way for more dynamic and inclusive teaching models.

1.2. Definition of Core Concepts

Generative AI refers to artificial intelligence systems designed to create diverse forms of content, including text, images, audio, video, and other multimodal outputs. These systems operate by analyzing and learning from existing datasets, enabling them to produce new, contextually relevant material. In the field of education, generative AI has been increasingly utilized for tasks such as content creation, personalized learning experiences, and the evaluation of teaching methods. Chinese cultural education, on the other hand, involves fostering both linguistic proficiency and cultural understanding. This includes exploring areas such as literature, historical narratives, traditional customs, artistic expressions, and societal practices. This study examines how generative AI can contribute to the development of educational resources and the innovation of teaching methodologies, with a focus on harmonizing technological advancements with educational objectives to enhance instructional effectiveness and promote cultural understanding.

2. Theoretical Correlation between Generative AI and Chinese Cultural Teaching

2.1. Core Objectives of AI-Assisted Cultural Teaching

AI-assisted Chinese cultural education is designed to enhance the overall teaching and learning experience by leveraging intelligent technological tools. The primary goals of this approach span three interconnected areas: the transmission of knowledge, the development of skills, and the cultivation of cultural understanding. In the realm of knowledge transmission, AI enables the efficient organization and presentation of a wide array of cultural materials, including historical documents, literary compositions, artistic creations, and modern cultural trends. This broadens the scope of learning and provides students with access to diverse perspectives [3]. Regarding skill development, AI tools play a pivotal role in helping learners acquire language proficiency, critical thinking abilities, and analytical skills. These tools achieve this by offering interactive exercises, providing immediate feedback, and creating adaptive learning pathways that cater to individual strengths and areas for improvement. In terms of cultural understanding, AI facilitates immersive and contextually relevant engagement with Chinese culture, allowing learners to explore cultural norms, values, and traditions in meaningful ways. Generative AI, in particular, enhances teaching by enabling the creation of innovative instructional scenarios, such as simulated cultural dialogues, role-playing activities, and multimedia storytelling. Additionally, it supports personalized learning by tailoring feedback and pathways to meet the unique needs of each student. By integrating these functions, AI-assisted teaching creates a dynamic and responsive educational environment that aligns with learners' needs, fostering both linguistic competence and cultural literacy in a comprehensive manner.

2.2. Educational Attributes of Generative AI in Cultural Teaching

Generative AI exhibits unique educational characteristics that make it particularly effective for teaching Chinese culture, especially in areas such as content creation, individualized learning, interactive participation, and prompt feedback [4, 5]. By leveraging its multimodal generation capabilities, AI can produce diverse educational materials, including written texts, visual imagery, audio recordings, video content, and even virtual reality environments. These resources provide learners with immersive and contextually rich experiences, fostering a deeper comprehension of cultural concepts. Furthermore, generative AI can adapt instructional content dynamically to align with the

specific needs and preferences of individual learners. This includes taking into account factors such as their existing knowledge base, language proficiency, learning speed, and personal interests. Such tailored approaches not only support differentiated learning but also empower learners to engage with cultural topics in ways that are meaningful to them, thereby enhancing their motivation and engagement. Additionally, AI enables real-time interaction and continuous assessment by offering immediate feedback, actionable suggestions for improvement, and reflective prompts. These features contribute to heightened cognitive engagement and improved self-awareness in the learning process. Beyond its role as a technological tool, generative AI functions as a comprehensive support system that integrates language skill development with cultural understanding. This dual focus bridges the gap between theoretical knowledge and practical application, enriching the overall educational experience and fostering a more holistic understanding of cultural nuances.

2.3. Theoretical Foundations

The integration of generative AI into Chinese cultural education is rooted in foundational theories that emphasize the transformative potential of technology and the importance of cultural knowledge. Educational technology theory highlights how advanced digital tools can revolutionize traditional teaching methods by aligning technological capabilities with pedagogical goals. This alignment fosters efficiency, personalization, and adaptability in learning processes, allowing educators to implement strategies that enhance both cognitive and emotional engagement. Generative AI serves as a bridge between instructional objectives and learner interaction, enabling the design of innovative teaching approaches that cater to diverse learning needs and preferences. By leveraging these tools, educators can create dynamic and interactive learning environments that promote deeper understanding and sustained interest in cultural topics. Meanwhile, cultural capital theory underscores the significance of accumulated knowledge, skills, and cultural competencies in shaping learners' intellectual growth, social mobility, and ability to engage in meaningful cultural dialogues. Generative AI contributes to this process by enabling the creation and dissemination of culturally rich content, offering learners opportunities to actively construct knowledge, express cultural ideas, and develop intercultural awareness. This dual theoretical foundation ensures that AI-assisted cultural education not only supports individualized learning but also promotes educational equity by providing access to diverse cultural experiences that were previously limited by logistical or resource constraints [1, 6]. Through this integration, generative AI fosters a more inclusive and enriched educational landscape.

3. Mechanisms of the Role of Generative AI in Chinese Cultural Teaching

3.1. Intelligent Content Generation Mechanism

Generative AI facilitates the swift creation of a wide range of high-quality teaching materials, encompassing textbooks, cultural narratives, historical documents, case studies, and multimedia resources. This mechanism significantly enhances the efficiency and accessibility of educational content, enabling educators to reduce preparation time while broadening the scope of available pedagogical tools. Furthermore, generative AI supports the adaptive customization of materials to meet specific teaching goals, accommodate varying learner proficiency levels, and cater to individual interests. For example, educators can design scenario-based learning modules, culturally themed exercises, or historical simulations tailored to the unique composition of their classes. This adaptability ensures that the content remains pedagogically relevant and intellectually stimulating. By offering a flexible and on-demand supply of resources, generative AI promotes differentiated instruction, enriches classroom activities, and fosters active student participation. This approach not only enhances the depth and breadth of Chinese cultural education but also creates a more immersive and engaging learning environment, ultimately contributing to a more comprehensive understanding of cultural heritage and its contemporary relevance [3, 7].

3.2. Personalized Learning Support Mechanism

By examining students' learning behaviors, performance trends, and individual interests, generative AI facilitates the creation of personalized learning pathways that implement differentiated instruction tailored to both group and individual needs [8]. This advanced mechanism offers targeted exercises and constructive feedback on various language skills, including vocabulary development, grammatical accuracy, pronunciation refinement, and reading comprehension. Simultaneously, it integrates cultural knowledge acquisition into the learning process. Interactive activities, such as dialogue simulations, role-playing scenarios, and project-based assignments, are designed to encourage the practical application of language skills within culturally relevant contexts. The adaptive capabilities of AI-driven support ensure that learners receive guidance precisely aligned with their unique requirements, fostering independent exploration and intrinsic motivation. Unlike traditional teaching methods, which often face challenges in addressing diverse learner needs, this approach significantly enhances engagement, accelerates the acquisition of skills, and promotes a deeper understanding of Chinese culture. Through sustained, personalized interaction, students are empowered to achieve meaningful and lasting educational outcomes.

3.3. Cross-Cultural Interaction Mechanism

Generative AI plays a pivotal role in fostering immersive cross-cultural learning environments by enabling students to engage with authentic or simulated cultural scenarios. Through virtual dialogues, multimedia-rich contexts, and interactive tasks, learners are exposed to culturally relevant experiences that enhance their understanding of language within its social and cultural framework. This approach allows students to practice communicative skills in realistic settings, gain insights into social norms, and develop an appreciation for the values embedded in Chinese cultural practices. By overcoming the temporal and spatial constraints of traditional classrooms, generative AI facilitates both real-time and asynchronous intercultural exchanges. Examples include virtual visits to historical landmarks, interactive storytelling sessions, and role-play activities that simulate cross-cultural negotiations. These experiences not only build practical language competencies but also foster intercultural awareness, empathy, and effective communication skills. Such holistic preparation equips learners to navigate globalized educational and professional landscapes with greater confidence and cultural sensitivity, ensuring their readiness for diverse international contexts.

3.4. Teaching Evaluation and Feedback Mechanism

Generative AI facilitates a comprehensive approach to teaching evaluation and feedback by systematically gathering, analyzing, and interpreting data related to learners' performance. This process offers educators detailed insights into various aspects of student learning, such as language proficiency, study habits, engagement levels, and understanding of cultural concepts. These insights enable educators to make precise adjustments to instructional methods and curriculum design, ensuring that teaching strategies are tailored to meet diverse learner needs. Simultaneously, students benefit from personalized feedback and tailored learning recommendations, which help them identify areas for improvement, encourage self-reflection, and support the development of a deeper understanding of challenging topics. By establishing a continuous cycle that integrates assessment, feedback, and adaptive instruction, this approach enhances the overall effectiveness of teaching and learning. Additionally, the system's ability to provide real-time updates allows for timely adjustments to the curriculum and teaching methods, promoting a dynamic and learner-focused educational environment. This evidence-based framework ensures that educational practices remain adaptable and responsive to individual and group learning requirements [9].

4. Current Situation and Challenges of Generative AI in Chinese Cultural Teaching

4.1. Overview of Application Status

The integration of generative AI into Chinese cultural education is currently in an exploratory phase, marked by initial implementations that show promise but remain limited in scope. Applications of generative AI in this domain include content creation, facilitation of online classrooms, intelligent exercises, and immersive virtual cultural experiences. Educational institutions such as universities, language training centers, and online platforms have begun utilizing AI to enhance curriculum design and instructional methodologies. This technology has been employed to develop multimedia teaching materials, simulate cultural scenarios, and create adaptive exercises tailored to individual learner proficiency levels. These innovations have demonstrated potential benefits, such as increased student engagement, improved motivation, and enhanced comprehension, suggesting that AI could significantly transform traditional teaching approaches [10, 11]. However, the adoption of generative AI is not yet widespread, and its integration into educational systems faces several challenges. Current implementations are often isolated or limited to pilot programs, lacking comprehensive evaluation frameworks to measure effectiveness and scalability. Additionally, there is a need for systematic innovation in teaching models, long-term integration strategies, and robust teacher training programs to ensure effective utilization of AI tools. Without these foundational elements, the practical impact of generative AI on large-scale educational outcomes remains constrained, highlighting the necessity for more structured and strategic approaches to fully realize its potential in Chinese cultural education.

4.2. Analysis of Prominent Challenges

Generative AI holds significant potential for enhancing Chinese cultural education, yet several challenges hinder its widespread and effective application. One major issue lies in the variability of quality, accuracy, and cultural depth in AI-generated teaching resources. These inconsistencies can lead to superficial or oversimplified representations of Chinese culture, which may fail to provide students with an authentic and nuanced understanding. Another challenge is the limited capacity of current AI systems to offer personalized and intelligent learning experiences. While adaptive learning pathways exist, they often fall short in addressing the diverse learning styles, proficiency levels, and cultural backgrounds of students, potentially reducing engagement and effectiveness. Furthermore, disparities in teacher competence and confidence in utilizing AI technologies present additional obstacles. Without adequate professional development, educators may struggle to integrate AI tools effectively into their teaching practices, thereby limiting the synergy between technology and pedagogy. Ethical and legal considerations also play a critical role, as issues such as cultural sensitivity, intellectual property rights, data privacy, and algorithmic bias must be carefully managed to ensure responsible implementation. These factors collectively highlight the need for improvements in the quality of AI-generated resources, advancements in system intelligence, comprehensive teacher training programs, and robust ethical and regulatory frameworks. Addressing these areas is essential for the sustainable and impactful integration of generative AI into Chinese cultural education [12, 13].

5. Path Optimization for AI-Assisted Chinese Cultural Teaching

5.1. Intelligent Resource Development Path

To fully harness generative AI in Chinese cultural education, it is essential to establish a systematic and sustainable framework for resource development that leverages multimodal technologies capable of generating diverse forms of content, including text, images, audio, video, and interactive virtual scenarios. This framework should go beyond basic content generation by incorporating modular design principles, which allow resources to be flexibly assembled to suit varying lesson plans, proficiency levels, and thematic focuses. A robust quality assurance system is critical, involving multi-layered content review conducted by language experts, cultural scholars, and pedagogical professionals to ensure that the materials meet high standards of accuracy, depth, and cultural authenticity. Furthermore, adaptive mechanisms should be integrated into the

system, enabling AI to refine and update content dynamically based on learner performance, feedback, and the latest developments in cultural knowledge. This approach ensures that educators have access to high-quality, ready-to-use materials while fostering continuous improvement and contextual adaptation of resources. By supporting differentiated instruction, enhancing learner engagement, and promoting effective cultural understanding, this strategy can significantly enrich the teaching and learning experience in Chinese cultural education, ultimately contributing to a deeper appreciation and comprehension of cultural heritage.

5.2. Innovative Teaching Mode Path

The advancement of diverse, AI-supported teaching methodologies plays a pivotal role in fostering an engaging and immersive educational environment. By integrating approaches such as blended learning classrooms, immersive cultural simulations, cross-cultural project-based tasks, and intelligent tutoring systems, educators can create experiential and learner-centered educational experiences. Generative AI offers the capability to design instructional sequences that are task-driven, problem-based, and scenario-based, while also providing adaptive guidance tailored to students' real-time progress and engagement levels. For instance, AI-generated role-playing activities can recreate traditional festivals, historical events, or intercultural communication scenarios, enabling students to practice language skills within authentic cultural frameworks. Furthermore, AI can enhance collaborative learning by dynamically forming student groups, proposing complementary tasks, and monitoring group interactions to ensure balanced participation and equitable contributions. These innovative teaching models not only help students achieve linguistic proficiency but also cultivate critical thinking, intercultural competence, and creative problem-solving skills. By bridging the gap between theoretical knowledge and practical cultural application, these methods prepare students to navigate complex, real-world challenges with confidence and adaptability.

5.3. Teacher Capacity and Professional Development Path

To effectively integrate generative AI into instruction, a well-structured professional development system is essential, emphasizing both technological proficiency and pedagogical innovation. Training programs should be designed to equip educators with the necessary skills to develop AI-based resources, implement advanced instructional design strategies, interpret data insights, and seamlessly integrate AI tools into classroom practices. Practical learning opportunities, such as case studies, peer observation, workshops, and mentoring, can play a pivotal role in helping teachers acquire hands-on experience, exchange effective practices, and collaboratively address challenges associated with AI-assisted teaching. Additionally, educators should be encouraged to adopt adaptive teaching strategies that leverage AI analytics to personalize learning experiences. Reflective practices, such as evaluating instructional outcomes and iteratively refining lesson plans, can further enhance the effectiveness of AI integration. By fostering a culture of continuous professional growth, educators can build confidence and expertise, ensuring that AI tools are utilized to their maximum potential. This approach not only enhances instructional quality but also promotes student engagement and improves overall learning outcomes, creating a dynamic and innovative educational environment.

5.4. Sustainable Development and Ethical Path

Sustainability and ethics are fundamental to the responsible integration of generative AI in cultural education. Institutions must develop comprehensive guidelines for AI usage, addressing critical areas such as data privacy protection, intellectual property rights, cultural authenticity, and transparency in content creation. These guidelines should ensure that AI-generated materials are accurate, respectful, and sensitive to historical and social contexts, thereby safeguarding cultural integrity. Ethical considerations should not only inform the development of AI tools but also their application in educational settings, promoting a balanced approach that respects cultural

diversity and heritage. Encouraging active student involvement in the creation and evaluation of AI-generated content can enhance engagement, foster critical media literacy, and cultivate a shared sense of responsibility in preserving cultural values. Furthermore, the implementation of robust monitoring and evaluation systems is essential to assess the long-term effects of AI-assisted teaching on educational outcomes, resource quality, and cultural understanding. These systems can provide valuable insights into the effectiveness of AI tools, enabling continuous improvement and adaptation [3]. By embedding ethical, sustainable, and participatory practices into the educational ecosystem, institutions can harmonize technological innovation with pedagogical goals and cultural preservation, ensuring that both educators and learners benefit from a forward-thinking and responsible approach to AI-enhanced cultural education.

6. Conclusion

This study systematically examines the mechanisms and implementation pathways of generative AI in Chinese cultural education, identifying intelligent content generation, personalized learning support, cross-cultural interaction, and teaching evaluation as key mechanisms for improving instructional effectiveness and deepening cultural understanding. The analysis indicates that generative AI can support more adaptive resource production, enrich classroom interaction, and strengthen feedback processes, thereby creating broader opportunities for learner engagement and instructional refinement. At the same time, several practical issues remain, including limited depth and diversity of educational resources, insufficient precision in personalization, gaps in teachers' technological and pedagogical readiness, and ethical and governance-related challenges. Addressing these issues requires continued improvement in intelligent resource design, innovation in teaching models, systematic enhancement of teacher capacity, and the establishment of sustainable implementation frameworks. Overall, this study extends the theoretical understanding of AI-enabled education and offers practical guidance for effective, innovative, and sustainable Chinese cultural teaching, with important implications for cultural communication, intercultural understanding, and broader educational development.

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