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AI empowerment in the reform and practice of university curriculum teaching: the case of Games for Preschool Children

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Abstract. The development of Artificial Intelligence (AI) technology has brought new transformations and opportunities to higher education, injecting fresh momentum into curriculum reform and high-quality talent cultivation. As a core course in the preschool education program, Games for Preschool Children lies at the heart of teaching reform, and its instructional quality directly affects the professional development of future preschool teachers. Taking this course as a case study, the present research examines the current problems in its teaching process, proposes targeted solutions, and explores the value and implementation pathways of AI-empowered curriculum reform in universities. The study aims to provide meaningful insights for advancing curriculum quality and cultivating outstanding preschool educators suited to the needs of the new era.

Keywords: AI empowerment, higher education, curriculum reform

1. Introduction

In recent years, with the rapid advancement of AI technology, generative AI represented by ChatGPT has provided strong technical support for innovation in higher education through its powerful natural language processing capabilities and pre-trained models [1]. Universities, bearing the lofty mission of cultivating high-quality talents, must seize this opportunity to integrate AI into education. At the 2024 World Education Conference, it was announced that "we will implement AI empowerment actions to promote the deep integration of intelligent technology and education (AI for Education)" and "actively advance the use of intelligence to assist learning, teaching, management, and research." This statement clearly defined the key tasks and focal points of higher education reform in the new era [2]. University teachers, therefore, should embrace this historic opportunity, integrate AI applications with disciplinary characteristics, and accelerate the use of AI technology in curriculum teaching. By optimizing teaching design, improving instructional effectiveness, and enhancing students' comprehensive qualities, universities can better cultivate innovative and high-caliber talents. As the fundamental vehicle for talent development, curriculum quality directly determines the quality of talent cultivation. The Games for Preschool Children course, a core component of the preschool education major, currently faces certain challenges in its teaching practices. There is an excessive reliance on textbooks and teacher-centered instruction, and the content, pedagogy, and assessment methods remain overly uniform and outdated. These limitations lead to low student engagement and poor teaching outcomes. To improve the quality of talent cultivation, it is therefore imperative to carry out reform in university teaching with Games for Preschool Children as a focal point.

2. Overview and significance of the Games for Preschool Children course

The Games for Preschool Children course primarily introduces the fundamental theories of preschool children's play, covering the content, characteristics, and organizational methods of various types of games. This course is offered in the first semester of the junior year. Prior to this, students have completed courses such as Observation and Analysis of Preschool Children's Behavior and Kindergarten Environment Creation and Teaching Aids Design. The knowledge and skills acquired from these prerequisite courses provide a solid foundation for learning Games for Preschool Children—for instance, understanding how to observe children's play behaviors and how to design teaching aids for children's games. As a core component of the curriculum, this course enables students to apply what they have learned in designing and implementing kindergarten games during their subsequent teaching practicum. Therefore, Games for Preschool Children serves as a crucial link in the overall course structure, connecting prior knowledge, current learning, and future practice. Like a central hub, it integrates theoretical understanding and practical skills, making it indispensable to students' professional development in preschool education.

3. The value of AI empowerment in teaching Games for Preschool Children

3.1. Innovating teaching content

In the current Games for Preschool Children course, teaching content largely relies on textbooks, lacking distinctiveness and innovation. AI, with its powerful knowledge base and information retrieval capabilities, can enrich and innovate course content. By building a comprehensive database of domestic and international cases of children's games, educators can create a course with global characteristics, broadening students' horizons and cultivating their international perspectives.

3.2. Optimizing teaching models

Play is the primary activity mode for preschool children and is inherently dynamic. Therefore, teachers should adopt dynamic teaching methods to "bring the knowledge in textbooks to life," making the classroom more engaging and vital. However, current teaching models are predominantly teacher-centered and monotonic, turning knowledge about play into static, lifeless content. Through AI empowerment, this traditional passive model can be transformed. AI can serve as a bridge for teacher-student interaction, enabling a collaborative teacher–AI–student learning environment. This shift allows students to transition from passive receivers of knowledge to active participants in learning. Moreover, AI can be used to build immersive and interactive game-based learning environments that visualize play concepts, enhance student engagement, and improve teaching efficiency.

3.3. Reconstructing teaching evaluation

Previously, teaching evaluations of this course focused primarily on assessing students' knowledge acquisition, neglecting the development of their practical abilities. Evaluation subjects were mainly teachers, making the assessments highly subjective, while the forms of evaluation—mainly paper-based—were outdated, monotonous, and lacked innovation and technical depth. AI empowerment can transform the evaluation process. By enriching evaluation dimensions and emphasizing skill development, AI breaks away from the traditional paper-based assessment mindset. It enables the visualization of game elements and establishes human–machine collaborative evaluation mechanisms, making assessment more diverse, scientific, and objective. In this way, AI reconstructs the evaluation framework, ushering in a new era of innovation in teaching assessment.

4. Implementation pathways of AI empowerment in the Games for Preschool Children course

4.1. Innovating teaching content: building an international game case database

By leveraging AI to innovate teaching content, the Games for Preschool Children course can achieve distinctive and creative instructional design. With its powerful knowledge base and information retrieval capabilities, AI can build a database of children's games from both China and abroad that align with children's developmental characteristics and interests, thereby constructing a globally oriented course resource. First, using generative AI tools such as DeepSeek, Doubao, and Wenxin Yiyan, educators can search for children's games worldwide. Through AI's advanced abilities in information integration and retrieval, the system can provide complete and systematic introductions—including gameplay, origins, and educational functions—of each game. Second, once these domestic and international games are collected, they can be categorized according to the features of preschool play. For example, based on the educational, physical, and recreational characteristics of children's sports games, DeepSeek can integrate information and introduce classic group games from English-speaking countries, such as Duck, Duck, Goose, along with detailed gameplay descriptions and analytical discussions on its educational value as a physical game. Finally, after classifying the collected games, the content can be uploaded to an AI-supported teaching platform for resource sharing. Students can instantly access these materials, and for games that particularly interest them, they can further refine, redesign, or innovate upon them.

4.2. Optimizing the teaching model: transforming from "passive reception" to "active learning"

Beyond generative AI tools like DeepSeek and ChatGPT, multimodal AI tools such as Jidream and Doubao can generate videos and images, enabling teachers to create digital human avatars for interactive classroom teaching. Students can ask questions directly to these AI-generated avatars, creating an engaging and interactive learning environment.

The integration of AI technology deeply embeds the "student-centered" educational philosophy into teaching practices. Through intelligent guidance, teachers can stimulate students' self-directed learning, transforming them from passive recipients of knowledge to active explorers [3]. This shift—from "teacher talks, students listen" to "students learn, teacher facilitates"—

represents a change in learning attitude and method. This process typically follows four stages: initial exploration – questioning – insight – internalization, in which AI functions as a "learning scaffold." First, the teacher assigns a learning task related to a key topic. Students, working in groups, ask AI questions to develop a preliminary understanding of basic concepts—this is the initial encounter stage, representing a surface-level cognition. Second, after grasping the basic ideas, the teacher raises more in-depth questions to stimulate critical thinking. Students continue to engage with AI, evaluate the relevance and accuracy of AI's responses, and refine their inquiries until they reach a more precise and comprehensive understanding—this is the inquiry stage. The teacher may then select several groups' discussion records for class presentation, inviting students to share their reflections on the human–AI interaction process. During whole-class discussions, students learn from their peers' questioning strategies and use AI's diverse feedback to broaden their perspectives, transforming one-way dialogue into multi-dimensional collaborative learning [4]. Next, under the teacher's guidance, the class collectively analyzes the group findings, synthesizing insights to reach a shared understanding—this constitutes the insight stage. Finally, in the internalization stage, students apply AI tools to real-world problems by proposing group-based solutions connected to current social issues. Each group's solution is then evaluated by AI to identify the most effective response.

Through this four-step process—initial encounter, inquiry, insight, and internalization—AI-empowered teaching facilitates a genuine shift from passive reception to active learning. Only when students become active participants in constructing knowledge does true learning begin.

4.3. Reconstructing teaching evaluation: from singularity to diversity, from outcome to process

The advancement of AI has expanded the boundaries of knowledge and made it possible to transform teaching evaluation from a single-dimensional, result-oriented system into a diversified, process-based one.

In terms of evaluation content, traditional teaching mainly focuses on students' understanding, memorization, and problem-solving skills related to specific knowledge points, while often neglecting the cultivation of students' intrinsic motivation and creativity—such as exploring why they learn and how their learning can be applied in practice [5]. In contrast, AI-empowered evaluation expands the scope of assessment beyond textbook content. For example, AI can generate diverse question types for the same topic, enabling multidimensional evaluation of learning outcomes. Taking "the characteristics of physical games for preschool children" as an example, after inputting relevant prompts, AI can generate three different question types—game design, discrimination, and case analysis questions. Compared with the traditional single-choice question format, these varied question types allow for a more comprehensive assessment of students' understanding, analytical ability, application skills, and creativity regarding the same concept.

In terms of evaluation form, traditional assessment methods have primarily emphasized summative evaluation and neglected students' developmental process, especially in practical assignments. For instance, in assessing the design of kindergarten play corners, students were previously required to submit only two-dimensional floor plans. This approach confined creativity to paper and limited students' innovative potential. With AI empowerment, teachers can reconstruct traditional evaluation formats by encouraging students to visualize their ideas through AI-generated videos, VR simulations, or 3D renderings. Moreover, innovation and technical proficiency can be incorporated as key evaluation criteria. Such visualized and multidimensional evaluation forms enhance students' process-oriented learning abilities. Through this process, students not only learn about AI but also learn with and through AI, transforming static textbook knowledge into "living knowledge," thereby fostering creativity and interdisciplinary thinking.

In terms of evaluation subjects, traditional assessments have largely relied on teachers, leading to excessive subjectivity—particularly in the evaluation of practical work. To improve objectivity, the evaluation process should be diversified to include multiple agents, with AI serving as one of them. In the context of rapidly advancing AI technologies, multiple AI systems can be used collaboratively to evaluate the same assignment and produce more objective, accurate, and consistent results. For example, when assessing students' lesson plans for preschool physical games, teacher-led evaluations were often limited by personal bias. Under AI empowerment, the evaluation can cover multiple dimensions such as completeness, logic, and creativity, with AI not only providing scores but also generating targeted feedback for improvement. This multi-agent evaluation mechanism significantly reduces teachers' workload, enhances assessment efficiency, and produces comprehensive and constructive evaluation reports. Such reports help students identify weaknesses, refine their work, and ultimately realize the true educational purpose of evaluation—to promote learning through feedback.

5. Difficulties and challenges

5.1. Weak student foundations

The Games for Preschool Children course currently faces a significant challenge: students generally have weak foundational knowledge and underdeveloped comprehensive qualities. In recent years, with the rapid advancement of AI technology, students'

understanding of AI—being a relatively new and complex field—remains superficial, and their ability to effectively use AI tools is limited. The AI-empowered reform of this course requires not only that students develop a deep understanding of AI but also that they apply AI technologies in their learning and practice. This presents a considerable challenge.

First, in the reform of AI-empowered teaching models, the primary goal is to increase classroom participation, using AI as a bridge for teacher–student interaction. The teacher's role should shift from being the "leader" of classroom teaching to the "facilitator" of student learning, allowing students to become true subjects of the learning process. Achieving this goal depends on transforming students' perceptions of AI—teaching them to utilize AI rather than merely use it. AI should serve as a tool and means for active learning. For instance, students must learn how to ask AI meaningful questions, critically assess AI's responses, and, through continuous inquiry, acquire more accurate and profound understandings. This process requires students to develop the courage to challenge authority, cultivate critical thinking, and exercise logical reasoning about the hierarchical structure of knowledge.

Second, in the reform of AI-empowered teaching evaluation, students are expected to apply AI technology in designing kindergarten play environments—an approach that overturns the traditional two-dimensional evaluation model. The AI-based evaluation method not only assesses students' mastery of theoretical knowledge but also demands higher levels of innovation and technical competence. These requirements must be carefully considered in the actual implementation of reform. Generative AI, with its vast knowledge base and powerful computational capacity, provides students with an ever-accessible "library." In such an environment, simple knowledge recall and accurate expression are no longer the core goals of higher education. Instead, developing higher-order thinking skills and fostering "learning for creativity" have become the defining objectives of education in the age of intelligent technology [6].

In summary, students are at the heart of teaching reform—whether in classroom learning or in completing assignments. AI empowerment injects new vitality into teaching, enhancing both quality and efficiency. However, weak student foundations remain the foremost challenge to be addressed. Therefore, reform practices must be tailored to students' actual learning conditions.

5.2. High demands on teachers' comprehensive competence

The development of AI technology has infused education with new vitality and transformation. For university instructors, adapting to the times and harnessing AI to empower teaching is now an imperative. Teachers must move beyond the traditional role of knowledge transmitters to become guides and facilitators of student learning. Understanding how AI empowers curriculum teaching has become the central issue—and it places higher demands on teachers' overall competence.

On the one hand, before implementing reform practices, teachers must clarify the purpose of integrating AI—why AI is being introduced, what problems it aims to solve, and what outcomes it seeks to achieve. In reality, many teachers adopt AI merely for its novelty rather than necessity, leading to superficial applications that are disconnected from teaching content. On the other hand, given the proliferation of AI tools, teachers must develop the ability to select appropriate technologies aligned with their course characteristics. For example, the generative AI tool DeepSeek excels at knowledge retrieval and can be used to build rich course case libraries or question banks, enhancing both the preparation and evaluation stages of teaching. Additionally, AI can optimize teaching models and stimulate innovation in instructional formats. Tools such as Doubao can generate customized images and videos to reinforce learning effects, while Jidream can produce digital avatars for interactive classroom experiences, facilitating dynamic engagement among teachers, virtual assistants, and students. Realizing these benefits, however, requires teachers to possess the necessary AI literacy and operational skills.

6. Conclusion

In conclusion, the development of artificial intelligence aligns with the higher education goal of cultivating innovative and high-quality talents. Taking the Games for Preschool Children course as an example, AI empowerment enables innovation in teaching content, optimization of teaching models, and reconstruction of teaching evaluation. From the student perspective, it promotes interdisciplinary thinking, enhances creativity, and fosters active learning. Nevertheless, achieving these goals presents challenges for both students and teachers. Students must strengthen their foundational knowledge and develop critical and creative abilities to make effective use of AI. Teachers, meanwhile, must embrace lifelong learning, stay abreast of technological developments, and integrate new tools and pedagogical ideas into their teaching practice. At the same time, it is essential to recognize the limitations of AI. Although generative AI tools have immense potential, their capabilities in language generation and accuracy remain imperfect. AI should be viewed as an auxiliary aid to teaching—not a replacement for human thought and learning. Teachers will continue to serve as the core and guiding force of education, ensuring that technology complements rather than replaces human intelligence.

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