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Methods for AIGC-Assisted Generation of Teaching Resources in the Education Sector

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ABSTRACT
With the rapid development of Artificial Intelligence Generated Content (AIGC) technology, the education sector is undergoing a profound transformation from digitalization to intelligence. Leveraging its powerful content generation capabilities, AIGC offers unprecedented opportunities for the personalized customization, dynamic updating, and multi-modal presentation of teaching resources. However, current applications of AIGC in educational scenarios still face severe challenges, including insufficient accuracy of generated content, prominent ethical risks, a lack of teacher competence in human-machine collaboration, and lagging evaluation systems. This paper aims to systematically review the status quo of AIGC-assisted teaching resource generation and deeply analyze core issues regarding technical reliability, educational adaptability, and ethical safety. On this basis, it proposes countermeasures such as constructing a "human-machine collaborative" generation paradigm, establishing a multi-level content audit mechanism, reshaping the teacher digital literacy system, and perfecting intelligent resource evaluation standards. Research indicates that through the dual drive of technological optimization and institutional innovation, the quality and applicability of AIGC-generated resources can be effectively improved, promoting supply-side reform in educational resources and ultimately achieving an organic unity of scaled education and personalized cultivation.

KEYWORDS
AIGC; Teaching resource Generation; Human-machine collaboration; Educational ethics; Personalized learning

1 Introduction

The richness and quality of educational resources are key factors determining educational equity and efficiency. The development of traditional teaching resources often relies on expert experience, suffering from pain points such as long cycles, high costs, slow updates, and difficulty in accommodating individual differences. In recent years, AIGC technologies represented by Large Language Models (LLMs) and Diffusion Models have made breakthrough progress, demonstrating astonishing capabilities in generating text, images, audio, and video. This technological revolution has brought a revolutionary opportunity to the production mode of educational resources: teachers can be liberated from tedious resource production to focus on instructional design and emotional interaction, while students can obtain tailored learning materials to meet diverse cognitive needs.

However, the introduction of technology is not a simple superposition of tools but a deep reconstruction involving educational philosophies, teaching models, and ethical norms. Currently, the application of AIGC in the education field is still in an exploratory stage, coexisting with blind optimism and excessive worry. How to ensure the scientificity and educational nature of generated content? How to evade algorithmic bias and academic misconduct risks? How to construct an efficient human-machine collaborative workflow? These questions urgently await responses from academia and practice. Based on the background of digital transformation in education, this paper focuses on the methodology of AIGC-assisted teaching resource generation. It aims to propose feasible optimization paths by analyzing the current status and problems, providing theoretical support and practical guidelines for building a high-quality, intelligent, and sustainable educational resource ecosystem.

2 Current Status of AIGC-Assisted Teaching Resource Generation

Currently, AIGC technology has preliminarily penetrated various links of educational resource generation, exhibiting significant characteristics of diversified application scenarios, multi-modal generation forms, and personalized service objects.

Firstly, regarding text-based resource generation, AIGC has become a capable assistant for teachers. Intelligent tools based on large language models can rapidly generate lesson plan outlines, courseware scripts, exercise banks, and test papers. They can even automatically write reading materials of different difficulty levels according to specific teaching objectives. For instance, a teacher only needs to input knowledge points and student situation descriptions, and AI can generate a complete teaching process design—including introduction, explanation, interaction, and summary—within seconds, greatly shortening lesson preparation time. Additionally, AIGC can assist in writing professional text resources such as code tutorials and experimental guides, lowering disciplinary thresholds.

Secondly, multi-modal resource generation capabilities have significantly improved. Traditional multimedia resource production requires professional software skills and long rendering times, whereas AIGC technology has made "text-to-image," "text-to-video," and "text-to-audio" accessible. Teachers can utilize generative AI to quickly create teaching illustrations matching course themes, restored videos of historical scenes, or foreign language listening materials. This low-threshold creation method not only enriches classroom presentation forms but also effectively addresses the scarcity of multimedia resources in schools in remote areas, promoting the balanced allocation of educational resources.

Furthermore, personalized adaptive resources have become a new growth point. Relying on in-depth analysis of student learning data, AIGC can dynamically generate specialized exercises, error analysis, and micro-lecture videos targeting individual weak knowledge points. This "thousand people, thousand faces" resource supply model breaks the limitations of traditional standardized textbooks, truly realizing teaching in accordance with aptitude. Currently, some intelligent education platforms have begun attempting to use AIGC to build virtual tutors, generating real-time feedback and guidance strategies to provide accompanying learning support for students.

Despite broad application prospects, current practices are mostly fragmented breakthroughs lacking systematic methodological guidance. Most applications remain at the shallow interaction stage of "prompt engineering," having not yet formed an automated generation pipeline deeply integrated with teaching logic. The quality of generated resources is uneven, leaving a gap before large-scale normalized application can be achieved.

3 Major Problems Facing AIGC-Assisted Teaching Resource Generation

Although AIGC demonstrates huge potential, in the actual process of educational implementation, the contradiction between its technical limitations and the particularity of education is becoming increasingly prominent, mainly reflected in four dimensions: content reliability, educational adaptability, ethical safety, and subject dependency.

3.1 Content Hallucination and Crisis of Knowledge Accuracy

AIGC models generate content based on probability prediction and essentially lack human understanding and reasoning capabilities, making them highly prone to "machine hallucinations." In educational scenarios, knowledge accuracy is the bottom line. However, existing models often fabricate false historical events, incorrect scientific formulas, or non-existent literature citations. For primary and secondary school students who lack discrimination abilities, such erroneous information is extremely misleading, potentially leading to cognitive biases or even distortion of values. Furthermore, model training data suffers from temporal lag, making it difficult to timely reflect the latest scientific achievements and social dynamics, resulting in outdated generated content that cannot meet the teaching needs of frontier disciplines. This characteristic of "speaking nonsense with confidence" forces teachers to conduct tedious manual verification when citing AIGC-generated content, paradoxically increasing their workload.

3.2 Insufficient Educational Adaptability and Lack of Pedagogy

Teaching resources are not merely a pile of information but embody profound pedagogical logic. Excellent teaching resources must conform to students' cognitive development laws, possessing clear scaffolding structures, appropriate difficulty pacing, and effective interactive designs. However, current AIGC generation often focuses on the completeness of information while neglecting the rigor of teaching logic. Generated lesson plans may have rigid processes lacking situational creation; generated exercises may have uneven difficulty distribution lacking gradient design; generated explanations may be too academic, failing to match the language habits of students in specific age groups. AI finds it difficult to understand the subtle dynamics of the classroom and students' emotional states, leading to generated resources that, although flashy in form, lack "educational warmth." This makes it hard to stimulate students' motivation for deep learning and may even result in "de-contextualized" knowledge indoctrination.

3.3 Algorithmic Bias, Copyright Disputes, and Ethical Risks

The training data for AIGC models comes from the internet, inevitably inheriting social biases and stereotypes present in the data. When generating teaching materials involving gender, race, or cultural backgrounds, AI may unintentionally reinforce discriminatory viewpoints, violating the principle of educational equity. For example, when generating images of professional roles, it might default to doctors being male and nurses being female, subtly influencing students' career perceptions. Additionally, the copyright ownership of AIGC-generated content remains legally controversial. Does a teacher's use of AI-generated courseware or images infringe upon the rights of original authors? Does a student's use of AI to complete assignments constitute academic misconduct? These blurred legal and ethical boundaries pose huge

challenges to school resource management and evaluation systems. Without effective regulatory mechanisms, AIGC could become a breeding ground for academic fraud and intellectual property infringement.

3.4 Weakening of Teacher Subjectivity and Dilemma of Human-Machine Collaboration

The high efficiency and convenience of AIGC can easily induce "technological dependency" among teachers. Some teachers may overly trust AI-generated content, abandoning deep thinking and secondary development of teaching resources, leading to homogenization of instructional design and the gradual degradation of teachers' professional judgment and creativity. Meanwhile, most current teachers lack necessary "AI literacy"; they do not know how to write high-quality prompts nor possess the skills to critically evaluate and correct generated results. This situation of "knowing how to use but not how to manage" and "daring to use but not daring to trust" renders human-machine collaboration superficial. It fails to truly exert the superimposed effect of "human wisdom + machine intelligence," instead creating a phenomenon where technology and education exist as "two separate skins."

4 Countermeasures for AIGC-Assisted Teaching Resource Generation in the Education Sector

In response to the aforementioned problems, it is imperative to construct a comprehensive countermeasure system integrating technological optimization, process reconstruction, literacy enhancement, and institutional guarantees to ensure the healthy and orderly development of AIGC in the education field.

4.1 Constructing a Closed-Loop "Human-Machine Collaborative" Generation Paradigm

Establish the core principle of "Teacher-Led, AI-Assisted" and reconstruct the resource generation workflow. A closed-loop process of "Prompt Design → Draft Generation → Expert Verification → Iterative Optimization → Final Publication" should be established. In this paradigm, teachers are no longer simple operators but act as "curators" and "gatekeepers" of resources. Specifically, first, dedicated prompt libraries oriented towards the vertical education domain need to be developed, guiding teachers to input clear teaching objectives, student situation analyses, and pedagogical requirements to improve generation quality from the source. Secondly, a "Human-in-the-Loop" mechanism should be introduced, mandating teachers to strictly audit and correct the knowledge points, logical structures, and value orientations generated by AI. Teachers should be encouraged to use AI for divergent thinking collisions, but the final decision-making power must remain in human hands. By leveraging the complementary advantages of humans and machines—utilizing AI's efficiency to process massive information and basic materials while relying on human wisdom to control the soul and emotional value of teaching—the leap in resource quality can be achieved.

4.2 Establishing Multi-Level Content Audit and Knowledge Enhancement Mechanisms

To address issues of accuracy and timeliness, measures must be taken from both technical architecture and management systems. Technically, "Retrieval-Augmented Generation" (RAG) technology should be adopted to connect general large models with authoritative educational knowledge bases (such as textbook libraries, academic journal databases, and curriculum standard libraries). During the generation process, the model should be forced to prioritize retrieving and citing credible sources to reduce hallucinations and ensure real-time content updates. Simultaneously, vertical large models targeted at educational scenarios should be developed, fine-tuned using high-quality educational corpora to make them more proficient in pedagogy and disciplinary logic. In terms of management, inter-school or regional "Resource Audit Alliances" should be established. AI should be used for preliminary review to filter obvious errors, followed by secondary review by subject experts to establish a "whitelist" resource library. For AIGC resources entering the classroom, label-based management should be implemented, clearly marking information such as "AI-Generated" and "Manually Audited" to ensure transparency and traceability.

4.3 Reshaping the Teacher Digital Literacy and Ethical Norm System

Integrate AIGC application capabilities into the core scope of teacher professional development. Launch layered and classified training projects that not only teach technical skills like prompt engineering and multi-modal tool usage but also cultivate teachers' critical thinking, ethical awareness, and human-machine collaboration strategies. Guide teachers to transform from "knowledge transmitters" to "learning designers" and "AI trainers."

Simultaneously, formulate a detailed "Ethical Guidelines for AIGC Application in the Education Sector." Clearly define the boundaries of academic integrity, stipulate the permissible scope of student AI usage, and establish copyright protection mechanisms. Promote the use of authorized datasets for model training and explore modes for copyright

confirmation and benefit distribution of AIGC content. At the school level, establish ethics review committees to conduct preliminary assessments of generated resources involving sensitive topics or high risks, strictly preventing algorithmic bias from penetrating the classroom and guarding the bottom line of educational equity.

4.4 Perfecting Intelligent Resource Evaluation and Feedback Standards

Break away from the traditional evaluation system dominated by "static indicators" and construct dynamic evaluation standards adapted to the characteristics of AIGC. Evaluation indicators should expand from single content correctness to multi-dimensional aspects such as "teaching adaptability," "interactive experience," "degree of personalization," and "ethical compliance."Utilize learning analytics technology to track student usage data of AIGC-generated resources (such as dwell time, interaction frequency, and grade improvement rates) to establish an evidence-based effectiveness feedback mechanism. Through data-driven approaches, continuously optimize the parameters and strategies of generation models. Furthermore, encourage the establishment of an open-sharing community evaluation mechanism, allowing frontline teachers, students, and parents to participate jointly in resource rating and commenting. This will form a resource ecosystem of "co-construction, sharing, and co-governance," forcing continuous improvement in generation quality.

5 Conclusion

The rise of AIGC technology marks that educational resource production has entered a new era of intelligence. It is not merely a tool for improving efficiency but also a catalyst for promoting the transformation of educational paradigms. Facing challenges such as content accuracy, educational adaptability, ethical safety, and subject dependency, we must neither give up eating for fear of choking nor rush forward blindly. Only by adhering to the concept of "people-oriented and technology for good," constructing a rigorous human-machine collaborative paradigm, solidifying the technical foundation of knowledge enhancement, comprehensively improving teacher digital literacy, and perfecting ethical evaluation systems, can we mitigate risks and unleash potential. In the future, with the further evolution of multi-modal large models and the deep integration with vertical education fields, AIGC is expected to become a "super teaching assistant" for every teacher and an "exclusive tutor" for every student. It will propel educational resources to leap from "standardized supply" to "personalized intelligent manufacturing," making high-quality educational resources as ubiquitous and accessible as air. In this deep integration of technology and education, we will eventually build a fairer, more efficient, and vibrant new ecosystem of smart education, laying a solid foundation for cultivating innovative talents adapted to the needs of future society.

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