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Research on the Potential Risks and Prevention Strategies of Generative Artificial Intelligence Empowering Junior High School Information Technology Curriculum

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Abstract: *Generative AI, with its technological advantages in cross-modal learning and content generation, presents new opportunities for the digital transformation of junior high school information technology courses, facilitating personalized teaching and innovative ability cultivation. It not only enriches learning resources and transforms resource allocation methods, but also drives innovation in teaching models and optimization of evaluation mechanisms, thereby significantly improving teaching efficiency and promoting students; personalized development. However, the application of this technology in classrooms has also revealed potential risks, including misalignment of teacher-student relationships, deviation in value orientation, failure of normative constraints, and behavioral practice irregularities. The causes of these risks can be attributed to four dimensions: application technology methods, value cognition levels, inherent technical flaws, and insufficient competency of users. Through strategies such as reconstructing teacher-student relationships, strengthening value guidance, and enhancing ethical awareness and practical abilities, systematic prevention of ethical risks can be achieved, promoting deeper integration and healthy development of generative AI with information technology education.*

Keywords: *Generative AI; Junior High School Information Technology Classroom; Potential Risks; Risk Prevention*

1. Introduction

Generative Artificial Intelligence (GAI), powered by deep learning and natural language processing technologies, demonstrates tremendous potential in education. It can instantly generate diverse teaching materials—including text, images, and videos—based on curriculum requirements, significantly enriching learning resources and advancing the "online + offline" teaching model. This innovation transforms teaching methodologies, resource allocation, and assessment approaches by making abstract knowledge tangible. Not only does it enhance teaching efficiency and quality, but it also fosters students 'personalized development [1], equipping them to better adapt to the information society. As a critical phase for cultivating digital literacy, junior high school information technology courses bear the important mission of nurturing students' core competencies. Deeply integrating generative AI technology into the information technology curriculum system is not only an inevitable choice aligned with contemporary trends but also a crucial measure to drive educational reform.

However, while generative AI technology has brought innovative transformations to junior high school information technology courses, it has also introduced numerous complex and pressing potential risks, including misalignment in teacher-student relationships, value orientation biases, regulatory constraints, and behavioral practice risks. Based on this, this paper analyzes the manifestations and causes of these potential risks from an application perspective, proposes preventive strategies, and aims to effectively mitigate them in junior high school information technology courses, thereby promoting the deep integration and healthy development of generative AI with these educational programs.

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2. The Performance of Generative Artificial Intelligence Empowering Junior High School Information Technology Curriculum

2.1 Enriching Learning Resources and Changing the Mode of Resource Allocation

From the perspective of supply-demand coupling, current digital resource services in basic education still face issues such as mismatched supply-demand, lagging resource updates, insufficient demand identification and prediction, and room for improvement in personalized and intelligent service levels [2].

Generative AI effectively bridges the gap between supply and demand for digital resources in junior high school information technology education through its powerful dynamic content generation and deep understanding of user needs. It can instantly respond to demands by dynamically creating highly personalized exercises, learning paths, and other resources, addressing issues of outdated resource updates and the inability of generic resources to meet individualized needs. Simultaneously, it can automatically and cost-effectively produce a large number of novel and timely teaching resources, enhancing the agility and adaptability of resource supply. This achieves precise alignment between the quantity, quality, and timeliness of resource supply and dynamic teaching demands, significantly improving the efficiency and accuracy of supply-demand coupling. As a key enabling technology, it tackles the core pain points in current digital resource services for junior high school information technology education.

2.2 Change the teaching mode and evaluation method

The current teaching model of junior high school information technology courses suffers from limited classroom interaction, making it difficult to implement differentiated instruction tailored to students; learning pace, interests, and foundational knowledge levels. This approach hinders students; personalized development. When encountering challenging problems, students often have to wait until the teacher; free time for solutions, resulting in delayed and insufficient feedback that undermines their motivation. The prevailing evaluation system for these courses predominantly focuses on knowledge memorization, leading students to mechanically replicate teachers; operational steps. This approach fails to effectively assess cognitive competencies such as innovative thinking and problem-solving skills. Moreover, it cannot capture or reflect students; critical performance and dynamic development trajectories during knowledge exploration and collaborative practice.

In pedagogical approaches, generative AI facilitates a shift from standardized instruction to student-centered learning by precisely identifying individual cognitive differences and dynamically creating personalized materials and adaptive pathways. Regarding assessment, it enables a transition from static knowledge testing to competency-based evaluation through continuous cognitive diagnostics and dynamically generated diversified tasks, effectively focusing on core competencies like problem-solving and critical thinking.

2.3 Improving Teaching Efficiency and Quality and Promoting Students' Personalized Development

The traditional "teacher lectures, students listen" model, relying on one-way knowledge transmission, struggles to meet individualized learning needs, resulting in uneven comprehension levels. Moreover, when confronted with abstract and complex concepts, passive listening fails to effectively stimulate critical thinking, often reducing knowledge retention to superficial memorization. These combined factors directly hinder the optimization of classroom teaching efficiency, fundamentally limiting the depth and breadth of knowledge delivery, and ultimately compromising the ability to achieve consistent, high-quality educational outcomes.

Generative AI dynamically transforms abstract and complex knowledge concepts into intuitive formats like images and animated videos. This deep "knowledge visualization" process effectively reduces cognitive load, enhances comprehension of complex concepts, and fundamentally improves teaching effectiveness. Its natural language interaction feature allows students to initiate conversations anytime, asking real-time questions about learning challenges or extended interests, while receiving clear, targeted explanations and supplementary resources.

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3. The Risk and Causes of Generative Artificial Intelligence Empowering Junior High School Information Technology Curriculum

3.1 The Risk Performance of Generative Artificial Intelligence Empowering Junior High School Information Technology Curriculum

3.1.1 The risk of misalignment between teacher and student

While generative AI has brought transformative breakthroughs to education, it has negatively impacted teachers 'leadership and students' autonomy. For students, the automation of generative AI weakens their proactive exploration abilities, suppresses independent thinking, hinders the cultivation of innovative thinking skills, and fosters technological dependence. As primary recipients of knowledge, students require modern education to avoid the "teacher-dominated classroom" scenario and continuously explore their central role in learning [3]. For teachers, generative AI replaces some knowledge transmission responsibilities through functions like one-click lesson plan generation and homework assignment. If teachers directly implement these AI-generated teaching plans, their dominant position will gradually weaken. As intelligent technologies progressively dilute teachers' leadership, students no longer perceive teachers as the sole knowledge transmitters, leading to teacher-student relationship alienation crises and ethical risks [4].

3.1.2 Value oriented deviation risk

The fairness of information technology education has been compromised. In the field of IT education, the application of generative AI has exacerbated the issue of educational equity. On one hand, the digital divide has intensified disparities in educational resources. Large-scale generative AI models like DeepSeek may prioritize sharing socioeconomic data from developed regions, potentially overlooking or underestimating the development status of less developed areas, thereby exacerbating social inequality [5]. On the other hand, academic integrity concerns have emerged. While generative AI can assist students in designing information projects and writing research reports, the lack of effective detection mechanisms may lead to plagiarism and code theft, undermining the fairness of course evaluations. Furthermore, if algorithms contain biased data, they may disproportionately affect students of different genders and ethnicities, further intensifying educational inequity and placing some students at a disadvantage in IT education.

The cultivation of digital values and social responsibility has weakened. Generative AI has achieved technological breakthroughs through group-based relative strategy optimization and multi-head attention mechanisms. While significantly enhancing computational and deep learning performance, enabling precise identification of individual political preferences through user behavior data for targeted recommendations, this also inadvertently creates "information cocoons" [6]. Users 'information streams become highly homogenized, exposing them only to content aligned with their existing ideologies, gradually trapping them in cognitive closed loops. Moreover, Western technology-driven algorithmic models may inherently carry ideological biases.

3.1.3 Risk of failure of regulatory constraints

Student privacy data breaches. Generative AI employs web crawlers to rapidly extract data from the internet, using user inputs as data sources. The legitimacy of personal information acquisition remains unclear during data collection and utilization processes. Models often retain such information during training and release it during user interactions, potentially leading to privacy leaks and data dispersion [7]. As minors, middle school students exhibit weaker data protection awareness, making the consequences of risks more severe. For instance, DeepMind researchers used divergence attacks to gradually steer ChatGPT-3.5 away from intended conversation content, inadvertently exposing original training data [8].

Unclear delineation of rights and responsibilities in technology applications. Unauthorized resource references in code architectures or design proposals generated by generative AI often lead to intellectual property disputes. Software like Deep Art and Midjourney frequently create content based on unlicensed artworks, leaving original creators without compensation [9]. Furthermore, when generative AI-generated knowledge contains inaccuracies that mislead educational processes, the ambiguity in liability determination may spark disputes over teaching incidents. This vague accountability framework not only disrupts normal teaching operations but also poses potential risks to educational quality and students' cognitive development.

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3.1.4 Risk of norm violation in behavior practice

The entanglement of cognitive rigidity and real-world perception. On one hand, AI-powered Q&A systems function as passive information channels, confining communication to users and generative AI. This creates a closed loop where users become trapped in algorithm-driven "cognitive cocoons" [10], rather than actively engaging with the information. On the other hand, the hyper-realistic virtual environments constructed by generative AI, if inadequately considering minors' cognitive development, may blur the line between virtual and real-world experiences.

3.2 The Causes of Ethical Risks in Junior High School Information Technology Curriculum Empowered by Generative Artificial Intelligence

3.2.1 Application Technology Attribute Dimension

Human-like attributes and human-computer interaction are the defining characteristics of generative AI [10], and also key factors contributing to ethical risks in its application within information technology curricula. These attributes continue to intensify. The "human-like" conversational capabilities of generative AI may lead middle school students to mistakenly perceive technology as an "omnipotent teacher," blurring the boundaries between humans and machines. During data accumulation and model optimization, algorithms originally designed to serve user needs may gradually transcend their "tool" attributes, evolving from auxiliary roles into dominant "intelligent entities." This reversal of human-machine status not only makes students in educational settings more vulnerable to ideological infiltration but also exposes personal privacy data to heightened risks of leakage, creating dual vulnerabilities for the digital education ecosystem.

3.2.2 Value dimension

Generative AI technology development prioritizes efficiency and user experience, while the core mission of junior high school information technology education is to cultivate "qualified citizens for the digital era," emphasizing the integration of technological application and humanistic literacy. An overemphasis on the convenience of technical tools may neglect the cultivation of deeper values such as information ethics and social responsibility, resulting in an imbalance between "technology-based education" and "value-based education."

3.2.3 Dimension of Technical Defects

The rapid iteration of generative AI technology and its "black box" effect create uncertainties in technological outcomes and complexity in risk management [11]. In this context, teachers struggle to scrutinize the content generation logic, potentially disseminating unfiltered misinformation. If training data contains biases, the generated content may reinforce stereotypes and mislead students' understanding of the information technology field.

3.2.4 Dimension of Core Competencies

In terms of educators, some junior high school information technology teachers exhibit notable deficiencies in knowledge, skills, and awareness regarding generative AI. They lack systematic understanding of potential risks such as data misuse, algorithmic bias, and misinformation dissemination, and fail to fully grasp the compliance boundaries of data protection regulations and technical applications. Meanwhile, students in junior high school are at a critical developmental stage for ethical judgment. Their awareness of consequences like privacy violations and legal liabilities caused by technology abuse remains insufficient, with relatively weak risk consciousness and self-discipline. This cognitive and skill immaturity, coupled with inadequate guidance and supervision from teachers, makes them prone to norm-violating behaviors such as data breaches, gullibility, or spreading misinformation when interacting with and using generative AI.

4. Ethical Risk Prevention of Generative AI in Junior High School Information Technology Curriculum

4.1 Reconstructing Ethical Relationships

4.1.1 Strengthening the Dominant Role of Teachers and the Substantive Position of Students

In the process of generative AI empowering education, teachers must clearly recognize their fundamental role as "teaching facilitators". Teachers should not simply act as passive recipients of

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technology, but must closely align with students 'specific learning conditions, conducting in-depth reviews, critical screening, and creative restructuring of generated content. During teaching processes, to prevent students from developing dependent personalities due to excessive use of generative AI, it is crucial to cultivate critical thinking, innovative thinking, and reflective spirit. Students should be encouraged to deeply reflect on fragmented and superficial knowledge generated, autonomously construct knowledge, and participate in discussions, thereby enhancing learning autonomy and creativity [10].

4.1.2 Promoting the Integration of Human-Machine Collaboration and Emotional Interaction

In junior high school classrooms, generative AI serves as a scientific enabler of teaching and enhances face-to-face teacher-student interactions, rather than replacing human instruction. Teachers can leverage generative AI to create detailed knowledge maps that reveal connections between concepts, as well as generate dynamic student profiles reflecting their mastery levels and areas for improvement. The student interface must align with junior high school students' cognitive development, clearly identifying their role as "technical tools" in prominent positions to prevent emotional dependence. Generative AI serves as the backend "analysis engine" providing data, while teachers act as front-end "guides" facilitating interactive learning.

4.2 Strengthening Value Guidance

4.2.1 Establish the principle of "people-oriented education" in technology application

In data processing instruction, educators can utilize generative AI tools to create teaching cases aligned with current social issues, guiding students to analyze the importance of data privacy protection, strengthen ethical responsibility, and deepen their understanding of safeguarding personal information security. When integrating generative AI into teaching processes, educators must assume the responsibility of vetting the generated content and educational resources, rigorously screening materials to ensure their ideological, scientific, and value-oriented aspects fully align with the requirements of socialist core values.

4.2.2 Bridging the Digital Divide and Advancing Educational Equity

To effectively bridge the digital divide, schools should systematically organize students to participate in specialized lectures on generative AI, covering its core concepts, application methods, usage guidelines, and potential risks. Additionally, dedicated technical instructors should be assigned to students with relatively weaker cognitive abilities, providing targeted guidance on tool usage to help them effectively utilize generative AI for learning tasks. Furthermore, tiered learning tasks should be designed to allow students with different cognitive levels to engage in personalized learning with generative AI assistance, thereby mitigating the potential exacerbation of learning disparities under large-class teaching models.

4.3 Enhancing Ethical Competence

4.3.1 Enhancing Teachers' Technical Ethics Education and Practical Competence

Conduct specialized teacher training programs for junior high school information technology educators, systematically enhancing their understanding of core ethical risk frameworks in generative AI, including data privacy violations, algorithmic bias, misinformation generation, and intellectual property disputes. Strengthen their knowledge and skills in managing compliance boundaries for technology applications. Encourage and guide teachers to integrate technical ethics exploration activities into teaching practices.

4.3.2 Cultivating Students' Digital Literacy and Ethical Habits

The ethical risks of generative AI should be systematically integrated into junior high school information technology curricula as a core module. Through carefully designed case studies and role-playing simulations, students will analyze ethical dilemmas in technology applications, clarify behavioral boundaries and responsibility scopes, thereby establishing the foundation for responsible digital citizenship awareness. Ethical practice tasks based on real-world technological scenarios can be assigned to reinforce the integration of knowledge and action.

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5. Conclusion

The integration of generative AI into junior high school information technology classrooms presents both innovative opportunities and complex challenges. This study reveals that while embracing generative AI; rich learning resources and its transformative impact on resource allocation, teaching methodologies, evaluation systems, and the enhancement of instructional efficiency and quality to promote students; personalized development, we must remain vigilant about its potential impacts on information authenticity, academic integrity, the cultivation of critical thinking, educational equity, and the autonomy of teachers and students. Generative AI provides technological empowerment for curriculum reform in junior high school information technology, but preventing ethical risks requires balancing technological innovation with the essence of education. By reconstructing teacher-student relationships, strengthening value guidance, and enhancing ethical competence, we can achieve a harmonious integration of technological instrumental rationality and educational value rationality. This approach helps junior high school students develop proper technological values and ethical judgment in the digital age, laying the foundation for cultivating future citizens who are technically proficient and culturally aware.

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