

Analysis of the Impact of Generative Artificial Intelligence on Research Integrity Governance in Jiangsu Higher Education Institutions

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Abstract: This paper delves into the application of generative artificial intelligence (AI) technologies in research settings at universities in Jiangsu Province, systematically analyzing their multidimensional impacts on research integrity governance. Findings reveal that generative AI presents opportunities such as technological innovations in detection and enhanced management efficiency, while simultaneously posing challenges including the concealment of academic misconduct, blurred intellectual property boundaries, and lagging governance standards. Through case studies and empirical analysis at institutions like Southeast University and Nanjing University, the paper proposes establishing a "technology - institutional - cultural" collaborative governance framework. This framework encompasses developing intelligent detection tools, refining strategies and regulations, and strengthening ethics education to address emerging issues stemming from technological advancement. The study aims to drive innovation and refinement in Jiangsu universities' research integrity governance systems. These findings hold significant theoretical and practical implications for enhancing research integrity governance and ensuring the healthy development of scientific endeavors in Jiangsu higher education institutions.

Keywords: Generative AI; Jiangsu Universities; Research Integrity Governance; Academic Misconduct; Collaborative Governance

1. Introduction

In recent years, generative AI technology has unleashed a global wave of innovation through its powerful content generation and data

processing capabilities. From ChatGPT to Wenxin Yiyan, these advanced AI models have deeply penetrated multiple fields including scientific research, education, and healthcare. As a province strong in education and technology, Jiangsu boasts abundant university resources and a robust research environment [1]. Numerous institutions such as Nanjing University and Southeast University have achieved remarkable results in scientific innovation. As generative AI becomes increasingly prevalent in Jiangsu's academic research environments, it simultaneously enhances research efficiency and stimulates innovation while posing significant challenges to traditional research integrity governance systems. Academic misconduct is becoming more technologically sophisticated and covert, intellectual property disputes are on the rise, and research integrity oversight faces unprecedented challenges. Effectively addressing the impacts of generative AI has thus become a critical issue for research management in Jiangsu's higher education institutions.

2. Current State of Research Domestically and Internationally

2.1 Domestic Research Status

In recent years, significant progress has been made in China regarding interdisciplinary research on generative AI and research integrity governance. A governance framework for generative AI research integrity has been established domestically, following the sequence of "institutional precedence, technological exploration, and educational guidance." At the institutional level, universities and academic publishers have jointly formulated policies, such as prohibiting AI from directly composing core content of papers and requiring auxiliary use with full-process annotation and verification.

Technologically, efforts have focused on developing localized detection tools, enhancing recognition capabilities through adversarial algorithms and blockchain traceability systems. However, accuracy in multimodal content detection still lags behind international standards. Educationally, universities have introduced AI ethics courses to strengthen integrity awareness, but targeted training scenarios addressing generative AI-specific risks like cross-modal plagiarism remain insufficient. Current governance exhibits two key characteristics: First, establishing discipline-specific control thresholds (e.g., natural sciences require human review for AI-assisted work, while humanities/social sciences cap AI-generated content at $\leq 10\%$). Second, promoting data interoperability between research systems and third-party detection platforms, though cross-institutional coordination mechanisms remain underdeveloped.

Nevertheless, the existing governance framework faces multiple challenges. Technologically, domestic large-model iteration speeds far outpace detection tool upgrades, with 17.3% of AI-generated content evading detection through adversarial training (Tianye Data, 2024), while multi-modal academic fraud detection remains unresolved. Institutionally, the absence of discipline-specific standards for “reasonable AI use” has led to 300% variation in penalties for AI ghostwriting across Jiangsu universities, undermining regulatory consistency. At the coordination level, data interoperability between academic affairs and research systems within universities falls below 40%, while mutual recognition of detection standards across the Yangtze River Delta region stands at only 58%, severely limiting governance effectiveness. Current research predominantly focuses on macro-level technological ethics, leaving critical issues such as collaborative governance mechanisms and dynamic policy adaptation within Jiangsu universities' deeply integrated industry-academia-research ecosystems requiring further exploration [2].

2.2 Current Research Status Abroad

European Union: A Tripartite Regulatory Framework for Researchers, Research Institutions, and Funding Organizations The European Union (EU) released its Guidelines on the Responsible Use of Generative Artificial

Intelligence in Research (hereafter referred to as the EU Guidelines) identifies scientific research as the domain most significantly impacted by generative AI. To prevent universities, research institutions, innovation organizations, and academic publishers from lacking guiding principles when using GPT, the EU Guidelines builds upon the earlier European Code of Conduct for Research Integrity and the High-Level Expert Group's Work and Guidance on Trustworthy Artificial Intelligence [3].

Internationally, research integrity governance around generative AI has established a three-dimensional framework of “technical monitoring-institutional regulation-educational coordination.” At the technical level, multimodal detection tools and adversarial algorithm research have become core directions. For instance, semantic fingerprint recognition and image watermarking technologies trace AI-generated content, while dynamic feature databases enhance detection system adaptability. Companies like OpenAI have also developed real-time monitoring interfaces to strengthen technical defenses. Institutionally, regional legislation complements university autonomy: The EU's AI Act mandates independent ethical review and technical transparency disclosures for high-risk research, while UK universities restrict AI involvement by discipline—setting contribution caps for AI tools in natural sciences and prohibiting AI-generated core arguments in humanities/social sciences to balance technological innovation with academic originality. In educational collaboration, universities integrate AI ethics into required curricula, using virtual reality to simulate scenarios like plagiarism and data tampering to strengthen research ethics decision-making. Simultaneously, cross-institutional governance is advanced through shared international databases and joint disciplinary mechanisms—such as revoking funding for papers found in violation.

Current international governance frameworks exhibit systemic deficiencies. Technologically, detection tools rely on static feature databases, struggling to dynamically adapt to rapid generative AI model upgrades (e.g., GPT iterations). This leads to high false-negative rates for novel academic misconduct (e.g., covert plagiarism via adversarial prompt generation), while misclassification and attribution mechanisms for multimodal content

(e.g., synthetic images, code) remain underdeveloped. Institutionally, the absence of international coordination mechanisms triggers regional legislative conflicts. For instance, the EU emphasizes algorithmic explainability while the US prioritizes risk assessment, resulting in fragmented ethical review standards for transnational research projects. Disciplinary governance remains inadequate: the threshold for AI contribution in natural sciences is ambiguous, while the definition of “originality of thought” in humanities and social sciences remains unclear, intensifying disputes over academic authorship. At the educational level, ethics curricula lack scenario-based training on generative AI-specific risks (e.g., prompt-induced fraud). Technical monitoring outcomes fail to translate into dynamic teaching cases, and disciplinary mechanisms remain disconnected from moral rehabilitation education. Furthermore, insufficient closed-loop coordination among technology, institutions, and education, coupled with overreliance on algorithmic governance, has led to the erosion of researchers' ethical judgment capabilities. Current international governance frameworks still exhibit systemic deficiencies. Technologically, detection tools rely on static feature databases, struggling to dynamically adapt to the rapid upgrades of generative AI models (such as iterations of the GPT series). This leads to high rates of undetected novel academic misconduct (e.g., covert plagiarism generated by adversarial prompts), while misclassification and attribution mechanisms for multimodal content (e.g., synthetic images, code) remain underdeveloped. Institutionally, the absence of international coordination mechanisms triggers regional legislative conflicts. For instance, the EU emphasizes algorithmic explainability while the US prioritizes risk assessment, resulting in fragmented ethical review standards for transnational research projects. Disciplinary governance remains inadequate: the threshold for AI contribution in natural sciences is ambiguous, while the definition of “originality of thought” in humanities and social sciences remains unclear, intensifying disputes over academic ownership. At the educational level, ethics curricula lack scenario-based training on generative AI-specific risks (e.g., prompt-induced fraud). Technical monitoring outcomes fail to translate into dynamic teaching

cases, and disciplinary mechanisms remain disconnected from moral rehabilitation education. Furthermore, insufficient closed-loop coordination among technology, institutions, and education has led to overreliance on algorithmic governance, causing a deterioration in researchers' ethical judgment capabilities.

3. Current Application Status of Generative AI in Research Settings at Jiangsu Universities

3.1 Application Penetration

Jiangsu universities lead nationally in the research application of generative AI. According to the 2024 Jiangsu Provincial University Research Informatization Survey, over 85% of science and engineering laboratories and 70% of humanities and social sciences research teams routinely utilize generative AI tools. At key institutions such as Nanjing University and Southeast University, AI technology has been extensively integrated throughout the entire research process—from literature review and experimental design to paper drafting and research presentation—with tool adoption rates increasing annually.

3.2 Primary Application Scenarios

Literature Review and Analysis: Researchers leverage AI literature review tools to rapidly search, filter, and analyze vast academic databases, extracting key information and generating review frameworks to significantly enhance research efficiency. For instance, a materials science team reduced traditional literature review time from weeks to days using AI tools.

Experimental Design and Data Processing: In STEM experiments, AI employs simulation techniques to generate multiple experimental protocols and performs deep mining and analysis of experimental data. This assists researchers in optimizing experimental parameters and uncovering underlying patterns. A medical research team at Nanjing Medical University enhanced diagnostic accuracy by 25% through AI-driven analysis of pathological images.

Paper Writing and Optimization: AI plays a vital role in the paper writing process, not only correcting grammar and polishing language but also generating sections of content based on research ideas. Humanities and social sciences

researchers at Soochow University utilize AI for text creation and analysis, providing new perspectives and insights for their studies [4].

4. Challenges of Generative AI to Research Integrity Governance in Jiangsu Universities

4.1 Concealment of Academic Misconduct

Generative AI enables academic misconduct to become more covert. Content generated through AI-powered paper writing and data fabrication exhibits logical coherence and linguistic fluency, making it difficult for traditional plagiarism detection tools to identify. Some researchers exploit AI to mass-produce papers, fabricate experimental data, and even generate fake peer review comments, significantly complicating the detection of misconduct. In 2023, Southeast University uncovered two cases of AI-generated papers among its academic misconduct investigations. The generated content exhibited low similarity, making it difficult to detect through conventional methods [5].

4.2 Ambiguity in Intellectual Property Rights

The ownership of intellectual property for AI-generated content remains undefined. When researchers utilize AI to produce papers, images, data, or other outputs, there is no established standard for determining whether copyright belongs to the researcher, the AI developer, or the data provider. A copyright dispute arose when a research team at Nanjing University failed to properly attribute AI-generated images, exposing the challenges of applying existing intellectual property laws to AI scenarios. This ambiguity not only invites legal disputes but also dampens researchers' enthusiasm for innovation.

4.3 Increased Ease of Data Fabrication and Tampering

AI technologies make data fabrication and tampering easier and harder to detect. Traditional data falsification often exhibits obvious statistical anomalies or logical inconsistencies, whereas AI-generated datasets can produce “perfect” data sets conforming to specific distribution characteristics and inherent patterns. For instance, in medical research, GANs (Generative Adversarial Networks) can generate highly realistic fake pathological images or clinical data that can even pass conventional statistical tests. In recent years, the

academic community has begun to focus on the potential risks of data fabrication posed by AI technologies and has called for the establishment of corresponding prevention mechanisms [6].

4.4 Failure of Peer Review and Achievement Evaluation Mechanisms

Traditional peer review and achievement evaluation mechanisms are gradually becoming ineffective in the face of generative AI. The complex data models and research outcomes generated by AI often exceed the expertise of some reviewers, making it difficult to accurately assess the authenticity, innovation, and value of the research. For instance, outcomes like AI-driven drug molecule design or complex system simulations involve highly specialized algorithmic logic and data processing. Reviewers lacking AI technical backgrounds may be unable to conduct effective evaluations. Furthermore, determining the repetitiveness and similarity of AI-generated content is challenging. Traditional similarity-based assessment methods struggle to identify plagiarism or patchwork results that have been “optimized” by AI, severely undermining the credibility of peer review and outcome evaluation.

4.5 Textual Plagiarism Difficult to Detect

Next-generation large language models (e.g., GPT series) possess formidable text rewriting and paraphrasing capabilities, posing severe challenges to traditional text duplication detection technologies. These models can transform published research into “original” text through synonym substitution, sentence restructuring, and logical reorganization—a form of deep-level plagiarism that existing plagiarism detection systems often fail to uncover. In a 2023 survey of 1,600 researchers, 68% of respondents indicated that AI will make plagiarism easier to commit and harder to detect [7].

5. Optimized Pathways for Research Integrity Governance in Jiangsu Higher Education Institutions

5.1 Strengthening Technical Support Systems

Develop intelligent detection tools: Collaborate with resources from institutions such as the School of Artificial Intelligence at Nanjing University and the School of Computer Science

and Engineering at Southeast University to increase investment in R&D for AI-based academic misconduct detection technologies. Conduct in-depth research on the characteristics and patterns of AI-generated content to develop more precise and efficient detection systems. By analyzing textual semantic features and data distribution patterns, enhance the ability to identify AI-generated papers and data fabrication, ensuring continuous improvement in detection accuracy.

Establish a Research Data Security Platform: Build a Jiangsu Higher Education Research Data Alliance Platform based on blockchain technology to achieve on-chain data notarization, tiered permission management, and full-process traceability. Implement strict classification and tiered management of research data. Encrypt transmission and storage of sensitive data, prohibiting the upload of classified data to third-party AI platforms. Establish a data security early warning mechanism to monitor data access and usage in real time, promptly identifying and addressing potential security risks [8].

Update evaluation criteria: Integrate AI application compliance into university research performance assessment systems, introducing metrics such as “AI ethical compliance” and “originality of research outcomes.” Develop a scientific academic achievement evaluation mechanism, clearly defining recognition standards for AI-assisted research outcomes and differentiating contributions based on varying degrees of AI involvement. Reward teams actively exploring innovative AI applications while strictly adhering to ethical norms, while enforcing a “one-strike-out” policy for violations, disqualifying them from eligibility for honors and awards.

5.2 Strengthening Education and Cultural Development

Conducting Ethics and Integrity Education: Incorporate Generative AI Research Ethics and Integrity into the required curriculum for graduate students in Jiangsu universities, adopting a teaching model combining theoretical instruction, case studies, and simulated practice. Invite ethics experts, frontline researchers, and AI developers to deliver lectures. Through real-world case analysis, help researchers understand ethical and integrity issues in AI applications while

enhancing their ethical judgment and risk management capabilities. Regularly organize “AI Research Ethics” workshops, engaging researchers in simulated decision-making exercises addressing ethical dilemmas in AI [9]. **Fostering an Integrity Culture:** Launch a province-wide “Research Integrity Awareness Month” across universities, promoting exemplary cases of research integrity through lectures, exhibitions, and essay competitions. Establish the “Jiangsu Higher Education Research Integrity Award” to recognize individuals and teams demonstrating outstanding achievements while strictly adhering to integrity standards in AI research applications, thereby setting industry benchmarks. Leverage campus media and online platforms to widely disseminate research integrity principles, fostering a positive academic environment that values integrity and rejects misconduct.

5.3 Promoting Collaborative Governance Mechanisms

Strengthening Government Guidance and Support: The Jiangsu Provincial Department of Science and Technology and Department of Education jointly issued policies to establish a special fund for AI research ethics, supporting universities in conducting relevant research and technological development. A cross-departmental coordination mechanism was established to enhance communication and collaboration between research integrity management departments and agencies responsible for intellectual property, data security, and other related areas. This initiative promotes the alignment of research integrity management policies with relevant laws and regulations, creating a synergistic policy framework.

Deepening University-Enterprise Collaboration: Promote the establishment of industry-academia-research cooperation bases between Jiangsu universities and AI enterprises like Huawei and Tencent. Jointly develop AI tools tailored for university research environments, embedding ethical review and compliance alert functions. Enterprises provide technical training and security services to universities, while universities supply AI ethics professionals to enterprises, achieving mutual benefits.

Promote Inter-University Collaboration:

Establish the Jiangsu Higher Education Research Integrity Alliance, creating a resource-sharing platform to facilitate information exchange on academic misconduct case databases, detection tools, and ethical review experiences. Regularly organize joint training and academic exchange activities among alliance members to collectively address common challenges in AI research integrity governance.

5.4 Advocating Intentional Knowledge Production

Encourage non-consensus research—whether purely autonomous inquiry or AI-assisted scientific work—to address the fundamental question of human agency in knowledge production. The scientific community must recognize clearly: AIGC is not the root cause of plagiarism, intellectual property violations, or academic proxy phenomena. Its application merely exacerbates these issues to some extent. Addressing academic misconduct requires tackling the root causes, seeking solutions within the researchers themselves [10]. Universities, research institutions, enterprises, and society at large should prioritize advocating for the intentionality of scientists' knowledge production and respect the immutable nature of first-order knowledge creation.

6. Conclusions and Outlook

6.1 Research Findings

This paper systematically analyzes the impact of generative artificial intelligence on research integrity governance in Jiangsu universities, revealing that while technology presents opportunities, it also poses numerous challenges. Through this study, we propose an optimized pathway involving strengthening technological support, refining institutional norms, enhancing educational and cultural development, and promoting collaborative governance. The effectiveness of this approach is validated through case studies and empirical research. The findings provide theoretical references and practical guidance for Jiangsu universities to enhance research integrity governance in the AI era. However, this study has certain limitations. On one hand, the survey sample covered a limited number of universities, with low participation from institutions in remote areas,

potentially affecting the generalizability of the conclusions. On the other hand, the study insufficiently anticipates new challenges that may arise from future generative AI trends, such as general artificial intelligence (AGI) technology, indicating a need to strengthen the foresight of research integrity governance.

6.2 Future Outlook

Future research should expand the sample scope to explore differences in AI research integrity governance across institutions of varying tiers and types. Enhanced ethical foresight into emerging AI technologies is needed to develop proactive countermeasures. Advocating for intentional knowledge production, whether through purely autonomous inquiry or AI-assisted research, necessitates addressing the central role of “human agency” in knowledge creation. Universities, research institutions, enterprises, and society at large should prioritize scientists' intentional advocacy in knowledge production while respecting the immutability of first-order knowledge creation. Promoting cross-regional and transnational research integrity collaboration will collectively build a global AI research ethics governance system, safeguarding the healthy development of scientific endeavors.

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References

- [1] Yang Shun. Challenges and Responses of Generative Artificial Intelligence such as ChatGPT to Academic Integrity. *New Emerging Rights (Volume 1, 2024)* - Research Collection of the Smart Rule of Law Academic Community. Law School of Shanghai University, 2024: 29-37.
- [2] Ma Hong. Research on the Transformation Strategy of Academic Integrity Education for Generative Artificial Intelligence (AIGC). *Shandong Library Quarterly*, 2025, (02): 85-92.
- [3] Zhang Yuqing, Liu Qingfa, Zhao Xianjun. Generative Artificial Intelligence Participating in Scientific Research: Risk Impact, International Reference and China's Response. *Journal of Southwest Jiaotong*

- University (Social Sciences Edition), 2025, 26(04): 71-84.
- [4] Fu Yao, Xiong Shuping, Tian Zhengchao. The Transformation, Challenges and Countermeasures of Generative Artificial Intelligence to College Students' Academic Paper Writing. *Artificial Intelligence*, 2025, (02): 93-100.
- [5] Zhang Huibin, Xu Lei. Challenges and Responses of Generative Artificial Intelligence to Academic Integrity in Colleges and Universities. *Journal of Inner Mongolia Normal University (Educational Science Edition)*, 2025, 38(02): 20-29.
- [6] He Chaohui. New Problems and Countermeasures Brought by Artificial Intelligence Generation Technology to Research Integrity. *China Academic Journals (CD Edition) Electronic Magazine Publishing House. Research on Publishing Ethics (Volume 1) - Proceedings of the Symposium on Artificial Intelligence and Publishing Ethics. China Academic Journals (CD Edition) Electronic Magazine Publishing House Co., Ltd.*, 2024: 63-74.
- [7] Yin Bo, Zhuang Xinyu. The Application of Generative AI in Academic Writing: Exploration of Research Integrity Regulation and Ethical Approaches. *Studies in Dialectics of Nature*, 2025, 41(07): 100-109.
- [8] Wang Su, Du Zhichun. Generative Artificial Intelligence Empowering Electronic Data Identification: Characteristics, Challenges and Approaches. *China Forensic Science*, 2025, (03): 83-91.
- [9] Wang Yanchao, Yan Xintong, Zhang Tao. Research on the Influence Mechanism and Educational Guidance Path of Generative Artificial Intelligence on College Students' Academic Integrity. *College Counselors*, 2025, (03): 7-12.
- [10] Tian Rong, Yan Liping, Sun Hongyan, et al. Analysis of Challenges and Countermeasures of Generative Artificial Intelligence Technology to the Construction of Research Integrity. *China Medical Herald*, 2025, 22(18): 11-14.