

The Boundaries and Regulatory Mechanisms of Generative AI-Assisted Teaching Applications in Higher Education in China

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Abstract. Generative AI empowers the digital transformation of higher education. The issues surrounding its application boundaries and regulatory mechanisms have garnered widespread attention. However, existing research often focuses on a single risk, lacking a systematic exploration. Moreover, relevant regulations and industry standards lag behind technological development, hindering the deep integration of technology and education. This paper explores the application boundaries and regulatory mechanisms of generative AI-assisted teaching in Chinese higher education. The analysis reveals that current generative AI in university teaching faces issues such as insufficient technical adaptability, academic ethics violations, and data security risks. Clarifying application boundaries and establishing a scientific regulatory system are crucial for regulating technology application and promoting high-quality education development. Based on this, this paper proposes suggestions for establishing AI application standards and boundaries tailored to teaching needs, improving a collaborative regulatory system involving multiple stakeholders, and developing a full-chain governance approach. It is of great significance to standardize the application of technology and promote the high-quality development of education.

Keywords: Higher Education, Generative AI, Assisted Teaching, Application Boundaries, Regulatory Mechanisms

1. Introduction

The generative technology of AI is rapidly developing and making big changes in the methods of teaching higher education in the East. It is increasingly used in many ways, such as personalized learning support, academic assessment of honesty, and interdisciplinary teaching.

However, problems such as academic dishonesty, replacement of basic learning content, and data security breaches often occur. Thus, the definition of where AI teaching can be used, and regulatory rules, have become the focus of academic and educational areas in the East. In addition, research in this area is progressing. Generic artificial intelligence also promotes the digital development of higher education.

Wang reviewed the process of formulating the policy of AI education. Li's research team analyzed ethical problems arising from teaching AI at universities. Many studies are now focused

only on individual risks. A comprehensive systematic study of the boundaries and the corresponding regulatory framework of AI in education is clearly not enough.

About the problems mentioned earlier, and this article refers to the limitations and regulatory requirements of generative AI that are related to teaching applications in Chinese universities. In the article on administration, hope to provide support for the development of this field.

2. AI applications and related regulatory mechanisms

2.1. Application scenarios in auxiliary teaching

In the process of digitalization of education, artificial intelligence has completely entered into interdisciplinary training of higher education because it is good at data processing and intelligent interaction. This combination changed the method of learning from experience to data, which has informed a new impetus to improve the quality of learning.

For example, in university teaching, AI grading assessment tools can be used throughout the educational process [1]. Before the class, it can help generate composition frames and tips. During classes, he will indicate grammatical errors in real time, and this can help optimize the expression of the language. After classes, he can give several rounds of feedback on the rating, and can also provide data support to evaluate teaching and help teachers more accurately guide different students [2].

In professional teaching of painting at colleges and universities, AI combines technical training and creative innovations to participate in a double-wheel drive mode. In training, AI computer vision modeling can analyze the lines and interpret the characteristics of classical works. So it can adjust the standardized linear drawings and new compositions, and the complexity of the training will be adjusted, and the problem of composition and proportions can be indicated in real time [3].

It is clear that artificial intelligence in higher education is not a simple addition of a tool, but a deep combination of the logic of the discipline of learning. This shows that people need to clarify the scope of generative AI in auxiliary training, and must establish a scientific normative approach that is necessary and urgent [4].

2.2. Regulatory policies and legislative status

Now that AI is evolving rapidly, standardized AI application management has become an important aspect in the field of academic security and data security. China has created a multi-level regulatory and law enforcement system with political oversight and legislation. It also provides a strong institutional guarantee for healthy AI development.

Academic journals have clear policies and strategies for AI management. There are also strict verification methods. This approach suggests that it cannot be approved by what the author says. In general, the verification process combines AI detection tools with manual evaluation -editors and external experts will help.

In addition, academic journals have a way to check the use of AI in their articles. Even if the article was published, it will still be held accountable when someone violates the AI. Most publishers periodically have appropriate verification methods. Many academic journals in universities also attach importance to this. For example, the journals of Shandong University (philosophy and social scientific publication) will use tools primarily to test all generative AI content in the presentation and retain the right to view published articles. The editorial department of the Academic Journals of Shandong University of Technology is entitled to a long-term review of

manuscripts and publications and will do so through professional control systems and external review by technical experts. The data shows that 72% of the 50 log publishers have clarified the AI-enforcement checking mechanism that shows that academic journals are very serious about standardizing the use of AI [5].

With regard to data security and privacy protection, China has established a comprehensive regulatory system with the law as a core. The Civil Code, which enters into force on January 1, 2021, details the content of the rights to privacy and the protection of personal information in Chapter 6 of Part IV. It clearly states that the processing of personal information must be agreed upon by herself or his guardian, and also refers to the rules for handling personal information in public places, stipulating the purposes, method, and scope of processing, and demands that it not violate the laws, administrative rules, or agreements of both parties. On November 1, 2021, the first law in China on the protection of personal information was officially implemented. This means that the data protection and privacy protection system, with the "Cybersecurity Act, the Data Security Act, and the Personal Information Protection Act," has been largely established as the core. On this basis, China has also used various rules, such as the "Planration on Self-Regulation of Internet SITC Services", a program document-"Regulations on the illegal collection and use of the method of identification of personal information information information information information technologies), Standard Document-"Code of Personal Information Security Information Technologies of Information Security", Administrative Rules -"Regulations on the Protection of Minors on the Internet", and the Internet Rules [6].

Indulgent regulatory policy and legislative practice have created a basic system for managing artificial intelligence in China from two key aspects of the norms of academic applications and data protection. This can not only cope with the practical problems caused by technological development, but also provide clear guidelines for the correspondence and orderly development of artificial intelligence technologies.

3. Challenges and obstacles

3.1. Technical limitations and application risks

In the application and regulatory framework for artificial intelligence research, generative artificial intelligence such as DeepSeek can help higher education perform teaching tasks, provide teaching and students with teaching events, research, and writing assistance. However, due to the general limitations of technical characteristics and the use of the educational environment, it is not possible to ignore the problem of the boundaries of application and regulatory deficiencies.

High-performance hardware and algorithm optimization are costly, which limits the overall application of technology and creates problems for the rational allocation of resources to regulators. Secondly, professional adaptation is not sufficiently elucible, blurring the boundaries of application. The current law of algorithms and learning discipline does not correspond, and it is easy to create content that is off of learning goals. Third, data algorithms have hidden risks that violate the basic regulatory requirements. The data used to train algorithms, if subjectively biased, will also make the algorithm biased. This will not only increase educational inequalities but will also affect the objectivity of teaching and scientific research, pointing to the fact that the regulatory system is insufficient. Fourthly, privacy and moral risks will cross the line [7].

Generative AI has led to a number of border issues, such as risks and regulatory loopholes, in support of teaching colleges and universities. To develop it well, it must be clear that it can be used, and the rules of regulation must be improved.

3.2. Academic ethics and data security issues

In the field of research on restrictions on AI and regulatory frameworks, people are concerned about how it can support the teaching of higher education in China. Genetically, ChatGPT can help university engineering education work well in the field of teaching and research. Because its scope is unclear, and there are many problems.

This risk will directly affect the field of AI in training, as well as make regulatory loopholes more. AI processes content teacher with their own characteristics, and when it helps, it's hard to say who is responsible for the results of the work more seriously. Some students use artificial intelligence to help, but do not say it. This is a violation of academic honesty, and it also shows that it quickly clarifies where AI can be used in training and where it cannot be used. This not only makes students not want to learn this, but also discourages them from creative thinking, and this will make people doubt their performance.

Even if the AI modeling says it gives priority to privacy, sensitive data such as personal information and teachers' and students' performance can still be leaked. Cyberattacks, data poisoning, this tool affects the quality of AI output, which shows that the security of regulatory data is especially relevant. In addition, artificial intelligence technology is becoming increasingly popular, and it is easy to widen the digital divide between ordinary people. Students who use these tools can gain a competitive advantage [8].

Integrating generative artificial intelligence into university engineering curricula presents several potential hazards. To optimize advantages and mitigate these risks, it is essential to strictly adhere to the defined scope of its use and institute a well - crafted, specific regulatory framework. This approach will safeguard the healthy and systematic advancement of generative AI within China's higher education sector.

4. Suggestions and international implications

4.1. Establishing generative AI application standards and boundaries tailored to the needs of higher education teaching

Centering around national policies and regulations as the fundamental foundation, and taking into account the unique requirements of higher - education instruction, the national institutions formulate the criteria and limitations for the use of generative AI. Through the combination of policy execution and technical assistance, must guarantee that these applications are both in line with regulations and advantageous in teaching contexts.

Regulatory policies are key to defining the red lines for the application of generative AI, effectively addressing common and specific issues such as copyright disputes, data security, and content discrimination encountered in teaching. Currently, there are numerous legal provisions in place to address these issues. For instance, the "Interim Measures for the Administration of Generative AI Services" clarifies the legality of data use and anti-discrimination requirements, directly setting boundaries for AI information invocation and content generation in teaching, thereby safeguarding the legitimate rights and interests of teachers, students, and academic institutions. The "Opinions on Accelerating the Promotion of Digitalization in Education" issued by the Ministry of Education and eight other departments propose requirements such as algorithm security assessment and the development of application guidelines, which serve as important levers for transforming policies into practical teaching standards and preventing application standards from becoming mere formalities [9].

First, benchmarking policies should improve the standards of application. For example, it is necessary to clarify the rules of ownership of copyright when AI refers to online educational resources. In addition, teachers and students must be required to explain the source when using the content created by AI. In order to make a comprehensive assessment of the security of AI training data in training, it is necessary to build a system for recording data sources. Finally, the integration of policy requirements into algorithms should be promoted. In educational scenarios such as schools, it is necessary to improve the AI algorithm review system. The main goal is to improve the ability to detect and prevent academic disem that speech and discriminatory speech. Technically, it is necessary to add a "protective barrier" to AI training applications. With this barrier, the content generated by the AI model can be controlled in real time. In terms of policy, oversight mechanisms should be established. It is necessary to regularly check whether the university's teaching request for AI meets the rules so that the policy requirements can be implemented well and fully.

4.2. Improve the collaborative supervision system and governance path for generative AI-assisted teaching

Form a cooperative oversight framework that encompasses multiple parties involved. Streamline the governance process throughout the entire continuum. Improve the efficiency of overseeing generative AI - supported teaching. Strike a balance between the enabling capabilities of technology and teaching that adheres to regulations.

The core of governance efficiency lies in the effectiveness, compliance, and adaptability of policy implementation, which directly determines the effectiveness of governance. Multi-stakeholder collaboration can clarify the boundaries of responsibilities for all parties involved, avoiding the drawbacks of "one-size-fits-all" management. Full-chain path optimization can dynamically respond to new challenges in technological evolution, both preventing risks such as academic misconduct and data leakage, and fully unleashing the potential of AI to empower teaching, thereby building a trusted teaching ecosystem [10].

First, it is necessary to create a multilateral legal and legal basis. The education sector should make a "white list" of AI tools that can be dynamically adjusted. In addition, they also need to work well on data security, create an ethical assessment method, and monitor it in accordance with the class and category. Schools should establish a mechanism for AI management and regular evaluation. They should develop different methods of use for different learning situations and create an intelligent database to regulate training data. Teachers should do supervision and management work well, and cannot replace teachers with artificial intelligence in the classroom, nor can they directly use AI to evaluate topics. In addition, teachers should teach students to distinguish between truthful and false information, and students should understand technical ethics.

Secondly, streamline the governance approach throughout the entire chain. First, delineate the responsibility demarcations of the government, educational institutions, businesses, families, and the community. Encourage companies to create secure artificial intelligence tools that are well-suited for educational settings and rectify algorithmic prejudice.

Next, enforce the "six no" strict regulations. Prohibit pupils from submitting AI-generated content as assignments or exam responses. Additionally, in primary schools, restrict the use of open-ended generation features.

Finally, institute a dynamic feedback system. This system will enable the refinement of regulatory policies according to actual teaching experiences.

5. Conclusion

An article on generative artificial intelligence (AA) has faced many regulatory challenges in helping Chinese universities with teaching jobs. The author believes that now there are several problems with AI. For example, where AI can be used to say clearly, there are no clear regulations, it can violate academic ethics, data security is risky, and there is technical incompatibility.

In accordance with national policies, it is necessary to develop rules for the application of AI and borders that meet the requirements for training. Intensification of efforts to strengthen the implementation of the rules and provide technical support should also be intensified. In addition, it is important to create a multilateral regulatory system. This can optimize the chain management process and balance the technical empowerment and compliance training.

In the future, differentiated research on the application boundaries and regulatory mechanisms of AI can be conducted, taking into account the teaching characteristics of different disciplines.

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