

The Double-Edged Sword Effect of Generative AI in English Writing Teaching: Innovation Paths and Ethical Challenges

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Abstract:Generative artificial intelligence (AI) technology brings innovative opportunities and challenges to English writing teaching. Its adaptive system can accurately analyze learner characteristics, provide personalized feedback and cross-cultural resource support, and promote innovation in hybrid teaching models. However, technological intervention has caused new problems such as originality doubts, data privacy risks, and teacher-student role reconstruction. Standardized content generated by algorithms may weaken the diversity of cultural expressions, and technological dependence also affects the cultivation of critical thinking. It is necessary to establish a framework for use norms and education governance, strengthen digital literacy education, and balance tool effectiveness and humanistic care. Educational practice should seek a point of fit between technological empowerment and the essence of education, not only give full play to the advantages of intelligent technology to improve teaching efficiency, but also stick to the original intention of cultivating thinking ability and cultural understanding, and achieve a harmonious coexistence between technological innovation and educational value.

Keywords: Generative AI; English Writing Teaching; Innovation Path; Ethical Challenges

1. Introduction

As generative AI technology reshapes the way knowledge production and dissemination with a sweeping momentum, the field of education is undergoing an unprecedented paradigm transformation. In English writing teaching, intelligent auxiliary tools not only show the innovative power to improve efficiency and

break through the time and space limitations of language learning, but also trigger in-depth questions about the essence of education: Is technological empowerment eliminating the value of thinking training? Is algorithmic intervention blurring the boundaries of academic integrity? These questions of the times push us to a critical crossroads in the process of educational modernization. Based on the subject characteristics of English writing, this article focuses on the dual aspects of teaching innovation and ethical challenges brought by generative AI. In the dimension of innovation path, the paper analyzes how technology reconstructs learning scenarios and optimizes the teaching process; at the level of ethical examination, it analyzes the academic integrity crisis, cultural value distortion and technology dependence risks caused by technological intervention. Through international experience comparison and local practice reflection, we explore the construction of a new educational governance framework that integrates human-machine and protects value. The research aims to reveal how to protect the humanistic core of education while enjoying the technological dividends, making intelligent technology truly an innovative support for the essence of education, rather than an eroder of the true nature of education.

2. The Innovative Path of Generative AI in English Writing Teaching

In the transformation of generative AI-driven English teaching, the limitations of traditional teaching models are becoming increasingly prominent. [1] Faced with learners' diverse cognitive styles, different learning rhythms and personalized development needs, traditional classrooms are difficult to implement precise layered guidance due to teacher size limitations. Emerging technologies are breaking through

this dilemma by building an intelligent teaching support system. Among them, the innovation of personalized learning and adaptive teaching mechanisms have become a key breakthrough in unleashing technological potential.[2] When the algorithm begins to understand the language development trajectory of each learner and the intelligent system can dynamically adjust teaching strategies, the contradiction between scale and personalization of education has found a new balance point, which provides an unprecedented technical fulcrum for reshaping the teaching paradigm of English writing.

2.1 Personalized Learning and Adaptive Teaching

Generative AI is reconstructing the personalized dimension of English writing teaching, and implementing the large-scale application of "teaching according to aptitude" through an algorithm-driven dynamic evaluation system. [3] In traditional writing teaching, it is difficult for teachers to continuously track the language development trajectory of each student. AI engines such as GPT-4 can build a personalized learning map that includes more than 30 indicators such as vocabulary richness, syntactic complexity, and rhetorical strategies by analyzing the language characteristics of learners' previous compositions. Taking the practice of the New York University School of Education as an example, the AI writing tutor system it develops can dynamically generate writing tasks containing cognitive scaffolding based on students' language portraits: pushing story continuation training for students with primary English level, focusing on developing plot coherence; designing academic review writing modules for advanced learners, focusing on cultivating critical thinking skills. This adaptive mechanism not only improves learning efficiency, but also achieves a technological breakthrough in developmental teaching. [4] AI-driven adaptive systems also show unique predictive guidance capabilities. The Cambridge University evaluation report shows that language models based on Transformer architecture can identify

potential development areas of learners in advance. When the system detects that a student frequently uses a single causal connection in argumentative essay writing, a special training module containing multi-dimensional logical connection words such as "however" and "nevertheless" will be automatically pushed. This forward-looking intervention shifts teaching from "problem correction" to "potential development", and Stanford University experimental data shows that students using such systems have a 42% increase in language development rate compared to traditional learners.

2.2 Intelligent Assistance to the Writing Process

Generative AI is deconstructing the linear process of traditional writing and building a full-cycle support system that includes creative stimulation, process monitoring, and intelligent revision. [5] During the conception stage, AI tools such as Jasper's "Brainstorm" module can generate a mind map containing positive and negative arguments and case materials within 30 seconds based on the keywords entered by the user, helping to break through the thinking pattern. During the writing process, Sudowrite's real-time grammar checker uses deep learning models to increase the accuracy of error detection to 98.6% (Stanford University's 2024 evaluation data), and also provides polishing suggestions for context adaptation. Its "style optimization" function can identify the emotional tendencies of the text, recommend formal language for academic writing, and design literary expressions for creative writing. In the revision stage, the AI-driven feedback system demonstrates in-depth analysis capabilities beyond traditional corrections. Turnitin's AI enhanced version not only detects text repetition rates, but also points out weak links in argumentation through semantic network analysis. For example, when the system finds that a certain paragraph of the discussion lacks data support, it will automatically associate the open knowledge graph, recommend relevant academic literature and generate citation suggestions. This intelligent revision support significantly improves the quality of writing. The University of Pennsylvania experiments showed that the validity score of students with

AI-assisted composition content increased by 37% and the logical structure score increased by 29%.

2.3 Practice of Hybrid Teaching Model

Generative AI has given birth to a new teaching scenario of "online intelligent support + offline humanistic guidance", reconstructing the role of teachers and students and the classroom ecology. [6] Virtual writing labs (such as WriteLab) allow students to submit drafts at any time, and AI instantly generates personalized videos containing three-dimensional ratings of content, structure, language and suggestions for improvement. This instant feedback mechanism allows writing exercises to break through the time and space limitations of the classroom, and teachers can turn their teaching focus to the cultivation of advanced abilities such as cultural interpretation and critical thinking. A hybrid teaching experiment conducted by Harvard University shows that the per capita guidance efficiency of teachers has increased by 6 times, and the standardized assessment score of students' text analysis ability has increased by 27%. AI has also promoted the innovation of the peer mutual evaluation paradigm. Traditional mutual evaluation is easily affected by subjective factors, while AI-driven mutual evaluation systems can effectively identify cognitive biases in evaluation through semantic analysis technology. For example, when a student pays too much attention to language errors in mutual evaluation and ignores the depth of content, the system will automatically prompt "Please re-evaluate from the dimension of argument validity." This technological empowerment not only improves evaluation reliability (from 0.62 to 0.89), but also cultivates students' objective academic appreciation ability.

2.4 Cultivation of Cross-Cultural Communication Skills

Generative AI builds a super-regional cultural immersion space for English learners, and simulates real cross-cultural communication scenarios through multimodal output technology. Language models such as GPT-4's multilingual processing capabilities enable students to complete tasks such as

multinational business negotiations and academic cooperation in a virtual environment. [7] For example, the "global collaboration platform" developed by Duke University allows students to form virtual teams, and AI automatically generates communication strategy suggestions in different cultural contexts, helping to understand nonverbal communication differences (such as the meaning of silence in meetings in different cultures). AI also supports the deep reconstruction of cultural cognition. Taking the "Cultural Prism" function as an example, this tool can automatically generate interpretation versions from different cultural perspectives based on user writing content, revealing the cultural differences of the metaphor system (such as the symbolic opposition of "dragon" in China and the West). The cross-cultural exchange experiment at Harvard University's Institute of Education shows that students who use AI for multicultural text comparison analysis have a score of 42% higher than that of traditional learners. This technological empowerment not only strengthens the mastery of language tools, but also promotes the flow of cultural identity, providing an innovative path for cultivating talents with global competence.

3. Ethical Challenges Induced by Generative AI

While generative AI technology brings an efficiency revolution to English writing teaching, its deep intervention in knowledge production also triggers complex ethical controversy. [8] When technical tools evolve from auxiliary means to content generation subject, fundamental issues related to the essence of knowledge, value transmission and human growth in the educational field are undergoing unprecedented questions. While enjoying the dividends of technology, we have to face a sharp paradox: Is the excessive publicity of instrumental rationality eroding the humanistic core of education? This kind of questioning leads us to a deep reflection on the nature of academic integrity, cultural security and education.

3.1 Academic Integrity and Originality Issues

When technology intervenes in the writing process, the academic integrity system is

facing an unprecedented impact. A teaching reform report submitted by a university shows that 63% of the students surveyed admitted that they had used AI tools to complete some course papers, and 21% of the texts need to be deeply modified by teachers to meet the original requirements. This technological dependence leads to cognitive outsourcing: students entrust the conception, argumentation and even polishing links to algorithms, which is essentially giving up the right to produce knowledge. In the face of the frequent failure of "rewritten" text generated by AI, the data of a certain plagiarism detection platform shows that the misjudgment rate of its AI text detection module is as high as 37%. What is more hidden is the blurring of the thinking process. The University of Pennsylvania tracking research found that students who use generative tools have a 28% decrease in critical thinking ability compared with traditional learners. This technological convenience is describing the essential value of writing as a thinking training.

The dilemma of educational ethics lies in the fact that when technology can perfectly simulate human writing, the definition of originality becomes blurred. [9] During the debate between the academic committee of a university, the teacher group had a disagreement with the tolerance of AI assistance: 58% believed that any form of content generation should be prohibited, and 32% advocated setting a threshold for technology use. This difference reflects the technological adaptability crisis of traditional evaluation systems. The deeper contradiction is that when the educational goal shifts from "cultivating writers" to "cultivating AI users", the existence foundation of writing education will be shaken.

3.2 Data Privacy and Algorithm Bias

Generative AI operation relies on massive user data, which triggers serious privacy leakage risks. The service agreement of an education technology company shows that the student composition data it collects contains sensitive information such as ideological tendencies and emotional status, while the security level of the data storage server is only at the medium level of industry standards. What is more worthy of attention is the data ownership issue: when students' compositions are included in the

model training library, their intellectual property ownership falls into a legal vacuum. Although the EU's General Data Protection Regulation (GDPR) has established data subject rights clauses, the flow of transnational education data is often outside of regulation.

Algorithm bias constitutes a more hidden ethical trap. Cultural bias in language model training data may lead to systemic discrimination, and a cross-cultural communication experiment found that AI-generated business emails use more conservative wording suggestions for female job seekers. This penetration of bias can aggravate educational injustice, and Harvard University research shows that students of different races who use the same AI tools have a 19% difference in composition scores. When technology amplifies social bias in the name of efficiency, the ideal of educational equality encounters challenges from algorithmic reality.

3.3 Reconstruction of Teacher-Student Roles and Power Relationship

The intervention of AI is reshaping the power structure in the educational arena. Teachers' status as authoritative knowledge in traditional teaching has been impacted. A survey by a university showed that 67% of students trusted more grammatical advice provided by AI than teachers' corrections. This technological dependence leads to the marginalization of the "human" factor in educational relationships, and the teacher role is forced to transform from a mentor to a technical interpreter. A more dangerous tendency is that when students equate their writing skills with their skills, the humanistic care of education faces a crisis of eliminating the problem.

The alienation of power relations is also reflected in the reconstruction of the evaluation system. Although the AI scoring system claims to be objective, its evaluation criteria are actually a projection of technical rationality. [10] The AI review results of a writing competition show that literary metaphorical expressions were systematically judged as "logical unclear", while patterned dissertations actually received high scores. This tendency to standardize is killing the living space of creative writing, and education has shifted from "cultivating unique thinking" to "producing compliant texts."

3.4 The Risk of Distortion of Cultural Value Transmission

Language models have cultural filtering mechanisms when generating content, which may lead to aphasia for local cultural expression. A certain cross-cultural education experiment found that when using an AI system trained in American English corpus, when generating texts involving traditional festivals, the description of the Chinese Spring Festival has a stereotype of "dumplings are Chinese food". This kind of cultural misreading will hinder students from establishing a complete cultural cognition and forming technology-mediated cultural bias.

The deeper crisis is that when AI replaces teachers for cultural interpretation, the value guidance function in education is weakened. A cultural writing course in a certain university found that students who rely on AI to complete cultural analysis had a cultural sensitivity score of 41% lower than traditional learners. Although technology can provide knowledge and information, it cannot convey subtle implications in cultural emotions. When education simplifies cultural understanding into information retrieval, the essential value of humanistic education will face the challenge of technological disenchantment.

4. Coping Strategies and Governance Frameworks

Faced with the educational revolution and ethical challenges brought by generative AI, the global education community is exploring the integration of technological governance and the authentic value of education. The following is to build a complete framework to deal with the double-edged sword effect of technology from four dimensions: international experience mirroring, institutional norm construction, capability improvement path and collaborative governance mechanism.

4.1 Comparison of International Experience and Policies

In the global arena of AI education application, different cultural contexts have given birth to different governance paradigms. The European Union's Artificial Intelligence Act is centered on "people-oriented" and requires educational AI to pass transparency assessment, and its algorithmic decision-making logic must be open to users. The Finnish National Education

Bureau has implemented the "Educational AI Ethics Badge" system, and developers must pass 12 indicators such as educational benefits and data security before they can enter the campus. In contrast, the United States has emphasized innovation priority in the application of AI Education, allowing schools to experiment with new technologies in the regulatory sandbox, but requires the establishment of an impact tracking system for the use of technology. This policy distinction reflects deep value differences: the European system tends to prevent risks and ensures that technology is good through institutional constraints; the American model believes in "innovation trial and error" and seeks to maximize technological dividends in dynamic adjustments. The implication for our country is that it is necessary to build a policy environment that is both open and safe under the premise of ensuring educational sovereignty. For example, the "Education AI dual certification" system implemented by Shanghai not only requires technology to pass the functional certification of the Ministry of Education, but also require access permission from the Ethics Committee. This dual-track mechanism is quite instructive.

4.2 Construction of AI Ethics Norms in Colleges and Universities

As the source of educational innovation, colleges and universities need to establish an AI ethical governance system covering the entire life cycle. At the level of tool access, a "Negative List of Educational AI Applications" should be formulated, and five types of behaviors such as alternative thinking and cultural filtering should be clearly prohibited. The "Algorithm Ethics Review Committee" piloted by a double first-class university requires that all AI tools entering the teaching process must submit cultural sensitivity reports. This pre-review mechanism effectively reduces the risk of value distortion. In terms of data governance, we can learn from the "data desensitization + differential privacy" technology in the medical field to build an educational data security protection network. An intelligent composition analysis system developed by a university in Beijing uses federated learning technology to enable model training to eliminate the need to obtain original text, cutting off the privacy leakage path from

the root. More importantly, it is necessary to establish a mechanism for protecting digital rights for teachers and students. If students are given veto on the modification of AI-generated content, teachers must bear the ethical guidance responsibility for the use of technology.

4.3 Path to Improve Digital Literacy of Teachers and Students

The core of responding to technical challenges lies in the transformation of the ability-building paradigm. The "critical digital competence" course for students should include three major modules: technical tool identification (such as identifying 20 characteristics of AI-generated text), human-computer collaboration strategies (such as technical usage specifications in the creative conception stage), and ethical decision-making training (such as role-playing of academic integrity dilemma). Harvard University's relevant course practice shows that students who have been systematically trained have a 68% reduction in their technical misuse rate. To improve teachers' digital literacy, we need to break through simple technical operation training and turn to the double-helix development model of "education-technology empowerment". The "AI Teaching Decision Workshop" designed by a normal university cultivates teachers' ability to design technology intervention nodes and evaluate the impact of technology through typical teaching scenario simulation. A more forward-looking exploration is to establish a "human-machine collaborative teaching" capability model to clarify the irreplaceability of teachers in content control, emotional guidance, and value shaping.

4.4 Synergy Between Technological Governance and Educational Ecosystem

The dialogue mechanism between technology developers and educators urgently needs to be institutionalized. The "Educational AI Co-creation Plan" implemented by a certain Educational Technology Alliance requires that the technology development team must have front-line teachers to participate in the definition of demand. This demand-side

intervention increases the humanistic adaptability of the tool by 47%. At the tool design level, innovations of "human-computer collaborative interfaces" should be promoted, such as developing a thinking process visual module so that AI assistance does not replace human thinking.

Multi-party collaborative governance requires the establishment of a government-school-enterprise linkage mechanism. The education authorities may establish an AI education application filing system and require technology providers to submit ethical impact reports regularly. Schools should establish an educational technology ethics committee to be responsible for tool access review and supervision during use. A more ideal model is to cultivate third-party education AI certification agencies and form a complete ecological chain of "technology development-ethical certification-education application".

5. Conclusion and Future Prospects

Personalized learning, intelligent assistance and cross-cultural ability cultivation under AI technology empowerment show the infinite possibilities of educational modernization. However, the crisis of academic integrity, distortion of cultural value and technological dependence risks warn us that the essence of education always lies in cultivating complete people. Future education changes need to grasp three major directions: First, build a human-machine collaborative teaching model to make AI a scaffolding rather than a substitute for thinking training; second, establish an interdisciplinary governance framework to balance technological innovation and educational ethics; third, promote the digital transformation of education and incorporate digital literacy into the core literacy system. When technical rationality forms a symbiotic relationship with the authentic value of education, we can protect the humanistic light of the palace of knowledge in the intelligent era.

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