The Impact of Artificial Intelligence on the Cultivation of Innovation Literacy among College Students in Guangxi

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Abstract： In the era of rapidly advancing generative artificial intelligence, the cultivation of college students' innovation literacy faces unprecedented opportunities and challenges. As the core competency of the "new generation" and the foundation for achieving technological self-reliance, improving innovation literacy has become a vital mission of higher education. Generative artificial intelligence, with its powerful content generation and data processing capabilities, provides effective support for students' creative stimulation and innovative practices. However, it also brings negative effects such as technological dependence, authenticity issues, and ethical risks. Existing studies mostly focus on technological functionality or pedagogical applications, lacking systematic analyses of the dual mechanisms through which generative AI both promotes and constrains innovation literacy. Integrated strategies addressing "technological dependence" and "ethical challenges" are also scarce. Therefore, this study aims to analyze the double-edged sword effect of generative AI on the cultivation of college students' innovation literacy from a multidimensional perspective, reveal its positive and negative pathways, identify key influencing factors, and construct a feasible model for collaborative response strategies. The results are expected to provide theoretical foundations and practical references for universities to optimize innovation education design, enhance students' rational use of AI, and formulate relevant educational policies.

Keywords: Generative Artificial Intelligence; College Students; Innovation Literacy; Cultivation Mechanism; Collaborative Strategy

1. Introduction

In the era of rapidly advancing generative artificial intelligence, the cultivation of college students' innovation literacy faces unprecedented opportunities and challenges. As the core competency of the "new generation" and the foundation for achieving technological self-reliance, improving innovation literacy has become a vital mission of higher education. Generative artificial intelligence, with its powerful content generation and data processing capabilities, provides effective support for students' creative stimulation and innovative practices. However, it also brings negative effects such as technological dependence, authenticity issues, and ethical risks. Existing studies mostly focus on technological functionality or pedagogical applications, lacking systematic analyses of the dual mechanisms through which generative AI both promotes and constrains innovation literacy. Integrated strategies addressing "technological dependence" and "ethical challenges" are also scarce. Therefore, this study aims to analyze the double-edged sword effect of generative AI on the cultivation of college students' innovation literacy from a multidimensional perspective, reveal its positive and negative pathways, identify key influencing factors, and construct a feasible model for collaborative response strategies. The results are expected to provide theoretical foundations and practical references for universities to optimize innovation education design, enhance students' rational use of AI, and formulate relevant educational policies.

Against this backdrop, the rapid development of generative AI presents both historic opportunities and formidable challenges for cultivating college students' innovation literacy. As a technology characterized by powerful content generation and complex data processing capabilities, generative AI enables efficient data analysis, creative ideation, and content creation. Yet, its "double-edged sword" effect is increasingly evident: overreliance on such tools may weaken students' independent thinking and deep innovation capacities, while issues of

authenticity, copyright, and ethics raise higher demands for critical thinking and moral judgment. Studies have emphasized that the "filter bubble" effect of algorithms can trap students in a homogeneous information environment, which is not conducive to the cultivation of diverse thinking and innovative character [1].Consequently, the key question lies in how to harness the empowering potential of generative AI while effectively mitigating its inherent risks.

Current academic research tends to focus on AI's technological or pedagogical dimensions, lacking comprehensive analyses of its bidirectional impacts on innovation literacy. This study thus seeks to fill this gap by systematically examining the mechanisms through which generative AI both facilitates and constrains innovation literacy, identifying key influencing factors and potential risks, and constructing an actionable, multidimensional response framework. The findings aim to enrich the theoretical understanding of the "AI–innovation education" nexus and provide practical guidance for educators, students, and policymakers in promoting rational AI use and enhancing innovation education quality.

2. Literature Review

2.1 The Imperative of Innovation Literacy in the New Era

Innovation literacy represents a fundamental attribute of the new generation and a key foundation for technological self-reliance. Strengthening its cultivation has become a strategic priority for higher education. College students, as the backbone of innovation and reform, are vital to national scientific and technological advancement. From the perspective of key competencies, innovation literacy is a comprehensive composite quality consisting of four core elements: innovation awareness, innovative thinking, innovative ability, and innovative character. Among them, innovation awareness is the prerequisite, innovative thinking is the core, innovative ability is the key support, and innovative character is the inherent guarantee [2]. The systematic cultivation of innovation literacy requires the integration of educational resources and the design of a closed-loop training process of "cognition-practice-reflection", which provides an important theoretical basis for the

construction of innovation education systems in universities.

2.2 Application of Generative AI in Education

Generative Artificial Intelligence (Generative AI) provides new tools and resources for cultivating university students' innovative competence. Generative AI is one of the significant development directions in the field of artificial intelligence in recent years, possessing robust data generation and processing capabilities. In the field of education, generative AI can assist students in complex data analysis, creative design, and automated content generation, thereby enhancing the efficiency and quality of their innovation. However, the rapid development of generative AI also poses challenges to the cultivation of university students' innovative competence. On the one hand, over-reliance on AI tools may lead to the weakening of students' innovative abilities, resulting in a "technology dependency" phenomenon. Relevant surveys show that phenomena such as "AI-assisted academic ghostwriting" have gradually emerged in colleges and universities; such excessive dependence will weaken students' independent thinking ability and restrict the development of innovative thinking [3]. On the other hand, the authenticity and ethical issues of AI-generated content also impose new demands on students' critical thinking and moral judgment. Therefore, how to effectively utilize generative AI to cultivate university students' innovative competence while avoiding its negative effects has become an urgent issue in the current field of education.

2.3 The "Double-Edged Sword" Effect

Preliminary academic research has revealed the contradictory "double-edged sword" role of generative AI in the cultivation of innovation literacy. On the one hand, as a powerful cognitive object and thinking scaffold, it can stimulate creative inspiration and optimize the innovation process, exerting a constructive influence on multiple dimensions of innovation literacy. On the other hand, its technical characteristics also contain deconstructive risks: the excessive expansion of instrumental rationality may erode the subject's critical and reflective spirit, leading to the alienation of thinking ability; while the defects of the technology itself in terms of authenticity, ethics,

and fairness may contaminate the source of innovation and mislead the direction of innovation practice. However, most existing studies have explored the application of generative AI in education from a single perspective, such as analyzing its functions and advantages from a technical perspective or discussing its impact on teaching methods from an educational theory perspective. Although these studies provide important references for understanding the role of generative AI in education, they lack a comprehensive analysis of its positive and negative effects and corresponding strategies.

However, a review of the existing literature reveals the following research gaps:

2.3.1 Fragmentation of research perspectives

Most studies approach from a single technical or theoretical perspective, lacking an integrated analytical framework to systematically explain the complex relationship between generative AI and various dimensions of innovation literacy.

2.3.2 Imbalance in the analysis of the "double-edged sword" effect

The exploration of positive and negative effects is often fragmented and not placed in the same research context for dialectical and related empirical investigation, making it difficult to comprehensively grasp its net effect and the boundaries of its influence.

2.3.3 Absence of research on coping strategies

Although problems have been identified, comprehensive research on how to systematically avoid risks and maximize the benefits of the technology is still lacking, especially the absence of empirically tested strategy models from a multi-stakeholder (schools, teachers, students) collaborative perspective.

3. Current Situation Analysis

3.1 Current Situation of Artificial Intelligence Usage among College Students in Guangxi

Table 1. Frequency of Artificial Intelligence Use

Usage Frequency	Percentage (%)
Frequent Use	39.18
Occasional Use	34.54
Rare Use	16.49
Never Use	9.79

The usage frequency of AI tools among college students in Guangxi is shown in **Table 1**. The survey results show that approximately 73.72%

of college students frequently or occasionally use artificial intelligence tools, indicating that AI has become widely integrated into students' learning and daily life. Less than 10% of students reported never using AI, suggesting a high level of AI penetration within universities. The relatively large proportion of high-frequency users (39.18%) further demonstrates that AI is gradually becoming an essential tool for learning and innovation among college students.

Table 2. Analysis of Students' Attitudes toward the Application of Artificial Intelligence in Learning and Teaching

Survey Item	Summary of Results
Support for using AI to learn knowledge and skills	The proportion of respondents who "agree" or "strongly agree" reached 60.82%, while only about 19% "disagree" or "strongly disagree."
Support for AI-assisted learning or work	60.31% of respondents expressed support (including "strongly agree"), while about 20% maintained a neutral stance.
Satisfaction with current AI usage in universities	Those who were "satisfied" or "very satisfied" accounted for 50%, while 31.44% rated it as "average," indicating a generally above-average perception of AI integration in higher education.
Agreement that universities should strengthen AI literacy cultivation among students	58.25% agreed or strongly agreed, suggesting that most students expect systematic AI literacy education.
Agreement that universities should enhance AI-teaching integration among instructors	56.7% agreed or strongly agreed, showing that students generally believe instructors need to improve their ability to integrate AI into teaching.

Students' attitudes toward the application of AI in learning and teaching are summarized in **Table 2**. In general, college students hold a positive and open attitude toward the application of AI in learning and teaching. Over 60% of students believe that AI can enhance learning efficiency and capability, indicating a considerable level of technological acceptance and awareness of AI application. However, about

20–30% of students remain neutral or cautious, reflecting that some still harbor doubts about AI's educational value. This may be related to factors such as limited teacher proficiency in AI or low integration of AI into course design.
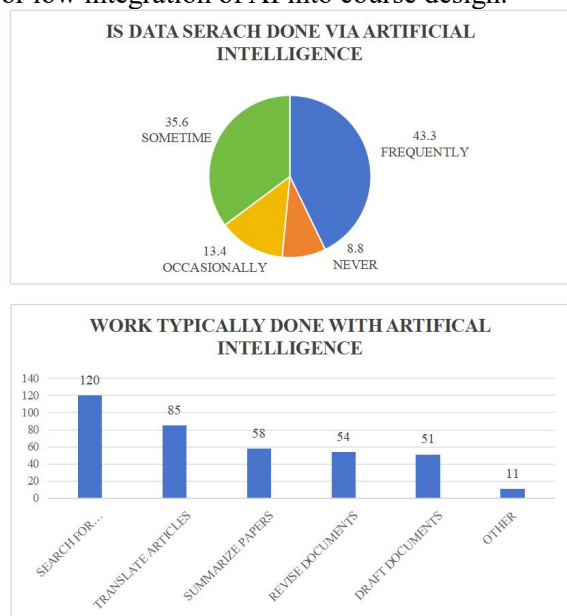

Figure 1. Application of Artificial Intelligence by College Students

The specific application types of AI among college students are presented in **Figure 1**. The survey results indicate that information search is the most prominent and frequently used type of AI application among college students. Among 194 valid responses, 42.3% of students reported using AI frequently for information retrieval, while 35.6% used it occasionally. In total, approximately **77.9%** of students employ AI for information searches during their studies or work.

Most students tend to view AI as an efficient tool for information retrieval and learning support. Nearly 80% of respondents use AI regularly or occasionally for material searches, demonstrating its significant convenience and practical value in knowledge acquisition. Only 8.8% of students reported never using AI for such purposes, likely due to limited awareness of AI tools or habitual reliance on conventional methods.

3.2 Current Status of Innovation Literacy Cultivation among College Students in Guangxi

Students' awareness and perceived importance of innovation literacy are shown in **Table 3**. The survey reveals that students' awareness of innovation literacy shows a "centralized middle, polarized ends" pattern. Only 10% of students report a strong understanding, 40% have an average understanding, and 20% have limited or no understanding, indicating a gap in the dissemination of innovation literacy knowledge.

In terms of perceived importance, 80% of students acknowledge that innovation literacy is important, reflecting a generally positive attitude toward its value in personal development. However, self-assessment results show that 60% of students consider their own innovation literacy as average, and only 25% rate themselves as strong, revealing a clear contrast between "recognizing importance but lacking competence."

Table 3. Awareness and Distribution of Innovation Literacy

Dimension	Category	Percentage (%)
Understanding of innovation literacy	Very familiar	10
	Fairly familiar	30
	Generally familiar	40
	Not very familiar / Not familiar at all	20
Perceived importance of innovation literacy	Very important	35
	Relatively important	45
	General / Not very important / Not important	20
Self-evaluation of innovation literacy level	Very strong	5
	Relatively strong	20
	Average	60
	Relatively weak / Very weak	15

Table 4. Analysis of Core Cognitive Tendencies of Innovation Awareness

Survey Item	Summary of Responses
Core elements of innovation awareness	Innovation interest, emotion, motivation, and will are widely recognized; fewer students mention innovation ability.
Key characteristics of innovation awareness	Most students identify it as a multi-dimensional psychological process, a drive for novelty, the starting point of innovation, and a quality with plasticity.

Table 4 summarizes students' core cognitive tendencies toward innovation awareness. Students' understanding of innovation awareness focuses primarily on intrinsic psychological factors such as interest, emotion, motivation, and will, while fewer mention practical aspects such as innovation ability. This suggests that students' cognition tends to emphasize internal aspects rather than the connection between innovation awareness and practical capability.

Regarding the characteristics of innovation awareness, most students correctly identify its psychological attributes, essential nature, key role, and plasticity. The fact that many students recognize its malleability implies that educational intervention can effectively enhance innovation awareness and that students hold positive expectations toward such cultivation.

Table 5. Recognition of Innovation's Impact on Personal Development

Impact Dimension	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree(%)
Innovation enhances research ability	15	50	25	7	3
Innovation promotes professional expansion	18	52	22	6	2
Innovation helps realize personal value	20	50	20	7	3
Innovation facilitates theory-to-practice transformation	18	48	24	7	3
Innovation is a requirement for social progress	22	50	20	5	3
Innovation drives professional advancement	20	52	20	6	2
Lack of innovation hinders outstanding achievement	18	48	22	8	4

Students' recognition of innovation's impact on personal development is presented in **Table 5**. The data show that students generally agree on the personal and social value of innovation. The items "Innovation is a requirement for social progress" and "Innovation promotes professional development" both have high agreement rates (around 70%). This indicates that students highly value innovation as a driving force for both individual and disciplinary advancement. However, about 20% of students maintain a neutral stance, and a small proportion (3%-8%) disagree, revealing that some students still need further guidance in understanding innovation's value.

Table 6. Participation in Innovation Activities and Educational Feedback

Dimension	Category	Percentage(%)
Willingness to participate in innovation activities	Very willing / Willing	50
	Neutral	35
	Unwilling / Very unwilling	15
Number of participations in innovation projects (e.g., "Challenge Cup", "Internet+", "Student Innovation Program")	0 times	30
	1 time	25
	2 times	20
	3 or more times	25
Satisfaction with innovation education at school	Very satisfied / Satisfied	40
	Neutral	45
	Dissatisfied / Very dissatisfied	15
Main approaches for cultivating innovation awareness	Innovation-related competitions (highest proportion);	

Table 6 shows students' participation in innovation activities and feedback on innovation education. Half of the students express a strong willingness to participate in innovation activities, but 35% remain neutral and 15% are reluctant. This suggests that while enthusiasm exists, participation initiative is uneven and could be enhanced by diversifying activity formats and lowering entry barriers.

In terms of project participation, 30% of students have never engaged in innovation projects, while 25% have participated three or more times. This indicates that although innovation opportunities exist, their reach needs expansion and sustained engagement should be encouraged.

Regarding satisfaction with innovation education, 40% of students express satisfaction, 45% feel neutral, and 15% are dissatisfied. Schools primarily rely on competitions or innovation projects to cultivate innovation awareness, while other channels—such as practical training, mentoring, or internships—are less utilized. This shows that the quality and diversity of innovation education still need improvement through optimized educational models and richer cultivation pathways.

4. Analysis of the Mechanisms of Artificial Intelligence's Influence on Innovation Literacy Cultivation

4.1 Theoretical Foundation: Constructivist Perspective on the Transformation of Innovative Learning

From the perspective of constructivist learning theory, knowledge acquisition is not a passive process of receiving external information, but rather an active process in which learners

construct understanding through exploration, collaboration, and reflection in authentic contexts. This theory emphasizes the contextual, social, and reflective nature of learning, advocating for "learning by doing" and problem-solving as pathways to deep learning. In this framework, the teacher's role shifts from that of a knowledge transmitter to that of a facilitator and scaffolder.

Under this theoretical framework, the introduction of artificial intelligence (AI) technology provides new support for cultivating innovation literacy. AI can create a dynamic, interactive cognitive environment between learners and knowledge through algorithmic analysis, scenario generation, and intelligent feedback. It supports autonomous exploration and innovative practice, promoting the transition from knowledge reception to knowledge construction, and from outcome-oriented to process-oriented learning. However, it is crucial to clarify the logical starting point and boundaries of AI's educational application—AI should focus on technical support such as data processing and scenario simulation while avoiding over-involvement in humanistic dimensions such as value judgment and emotional interaction, so as to prevent the instrumental alienation of education [4].

4.2 Functional Mechanisms of AI Empowering Innovation Literacy

The application of artificial intelligence (AI) in education is not merely a technological innovation, but a reshaping of teaching philosophies and learning methods. Studies have shown that AI-enabled educational applications can help students construct systematic knowledge frameworks through the visual presentation of knowledge, laying a foundation for the formation of innovative thinking [5]. Combined with the actual situation of innovative education in colleges and universities today, AI promotes the development of innovative literacy primarily through four mechanisms:

4.2.1 Situation reconstruction mechanism

Leveraging technologies such as virtual reality (VR), natural language generation, and intelligent simulation, AI can reconstruct learning scenarios that closely resemble real-world problems. For instance, students can conduct virtual exploration and creative design in AI-generated experimental environments, continuously revising their cognitive structures based on dynamic feedback. By integrating VR and AI technologies, universities in Guangxi can build simulated innovative practice platforms. Scholars have pointed out that AI-empowered immersive practice scenarios allow students to engage in innovative attempts in simulated environments, reducing practice costs while enhancing the authenticity of innovative experiences [6]. Such realistic learning scenarios strengthen learners' "problem awareness," helping them develop the ability to identify, analyze, and propose innovative solutions to problems in complex environments. This mechanism transforms the cultivation of innovative literacy from abstract theory to concrete practice.

4.2.2 Scaffolding guidance mechanism

Constructivism highlights the importance of scaffolding during learning. AI systems can provide personalized guidance and learning strategies based on learners' behaviors, knowledge maps, and cognitive trajectories. For instance, intelligent tutoring systems can automatically provide key resources or conceptual maps when students encounter cognitive bottlenecks. In this sense, AI functions as a "cognitive scaffold," not only improving learning efficiency but also facilitating the formation and structuring of innovative thinking.

4.2.3 Social collaboration mechanism

The development of innovative capabilities is inseparable from social interaction. AI technologies can facilitate multi-dimensional interaction among learners through intelligent collaboration platforms, online discussion systems, and generative knowledge management tools. Learners can use AI for group project collaboration, interdisciplinary research, or virtual team co-creation, thereby stimulating creativity through knowledge sharing and the collision of ideas. In this process, AI acts as a "collaborative intermediary," promoting the transformation of individual knowledge construction into collective wisdom. Studies have indicated that AI practice projects involving enterprises enable students to face real innovative demands directly, enhancing the practicality and transformation capacity of innovative outcomes [7].

4.2.4 Reflective feedback mechanism

Scholars have proposed that analyzing the limitations of AI-generated content through case-based teaching can effectively improve students' discriminative ability and independent

thinking ability [8]. AI can employ learning analytics and data visualization to provide instant feedback on learning processes, helping learners identify biases and blind spots, thereby strengthening their metacognitive reflection skills. Through continuous cycles of reflection and feedback, learners can optimize their innovation strategies and problem-solving approaches, fostering self-monitoring and sustained innovation abilities. This mechanism forms the foundation for "reflective innovation" within innovation literacy.

4.3 Logic of Innovation Literacy Formation from a Human–AI Co-Creation Perspective

Against the backdrop of AI-empowered education, AI is no longer a simple teaching tool but a "Cognitive Partner" for learners. Through human-AI collaboration, AI can form complementary interactions with learners in links such as information generation, problem-solving, and creative expression. During the process of dialogue, questioning, and co-creation with AI, learners continuously reconstruct their knowledge systems, expand the boundaries of their thinking, and realize the role transformation from knowledge recipients to knowledge creators. Tools such as AI painting and intelligent programming have provided diversified creative carriers for college students in Guangxi. Studies have found that AI painting technology can stimulate users' creative inspiration through style transfer and element recombination, and this technological empowerment is particularly significant for improving the innovative capabilities of students majoring in art design, digital media, and other fields [9]. Meanwhile, the multi-turn dialogue function of artificial intelligence can simulate problem-solving processes in different scenarios, fostering college students' critical thinking and innovative thinking [10].

Essentially, this human-AI co-creation process is an extended application of constructivist ideas: AI provides an open, dynamic, and interactive learning environment, and learners achieve the integrated construction of knowledge and capabilities through co-creation with AI, thereby promoting the synergistic development of innovative awareness, innovative thinking, and innovative capabilities.

4.4 Overall Logic of Mechanism Function and Educational Implications

In general, guided by constructivist learning principles, AI reshapes the chain of "context–scaffold–collaboration–reflection" mechanisms for cultivating innovation literacy, forming a learner-centered, innovation-oriented intelligent learning ecosystem. The application of AI has transformed innovation education in universities from knowledge transmission to inquiry-based creation, making innovation literacy cultivation more personalized, contextualized, and intelligent.

For educational practice, universities should strengthen AI's supporting functions in curriculum design, teaching evaluation, and teacher training. They should build intelligent learning environments consistent with constructivist ideas, fostering students' knowledge construction and innovation capacity through authentic tasks and human–AI collaboration. This not only supports the cultivation of innovative talents but also provides a theoretical and practical pathway for the intelligent transformation of future education.

5. Conclusions and Recommendations

5.1 Research Conclusions

Based on the strategic needs of "self-reliance and self-improvement in science and technology" and the cultivation of high-quality innovative talents in the new era, this study conducts a systematic analysis of the mechanism of action of generative artificial intelligence (AI) in fostering college students' innovative literacy, grounded in constructivist learning theory. The research holds that the rapid development of AI not only provides colleges and universities with new technical support and learning models for innovative education but also poses new challenges to educational philosophies, learning methods, and the structure of innovative capabilities. Its impact mechanism presents dual characteristics of coexisting "promotion and constraint."

First, in terms of promotional effects, generative AI can reconstruct learning scenarios and optimize the knowledge construction process through its powerful data analysis and content generation capabilities, providing students with a more personalized and open learning environment. On one hand, AI technology enables real-time feedback and multimodal learning support, stimulating students' desire for

inquiry and innovative inspiration; on the other hand, the multi-dimensional interactive space created by AI offers a new platform for students' collaborative innovation and interdisciplinary learning, promoting the integrated development of innovative thinking and comprehensive capabilities.

Second, regarding constraint effects, the popularization of AI technology has also brought potential "technological dependence" and "ethical risks." Some students have developed excessive reliance on AI-generated content in the learning process, which weakens their ability for independent thinking and in-depth creation. at the same time, issues such as the authenticity, originality, and intellectual property of AI-generated content place higher demands on students' critical thinking and awareness of academic integrity. Thus, the impact of generative AI on college students' innovative literacy is not a one-way empowerment, but a complex process of dynamic balance and interaction.

Overall, by reshaping learners' cognitive structures, learning methods, and innovation ecosystems, AI provides new technical paths and conceptual support for the cultivation of college students' innovative literacy. However, without scientific guidance and institutional guarantees, its "negative effects" may weaken students' innovation initiative and value judgment. Therefore, to construct a mechanism for fostering innovative literacy in the AI era, we must adhere to a people-oriented and innovation-driven approach, strengthen the educational ethics and institutional guarantees for technological application, and realize the organic unity of "technological empowerment" and "literacy improvement."

5.2 Recommendations

To fully harness the positive effects of AI in innovation literacy cultivation while mitigating its potential risks, a coordinated approach involving universities, teachers, students, and government authorities is essential. The following strategies are proposed:

At the University Level: Building an AI-empowered Innovation Education Ecosystem Higher education institutions should integrate generative AI into innovation education systems, improving curriculum design and evaluation mechanisms, and promoting the deep integration of AI and disciplinary teaching. Through intelligent learning platforms and innovation laboratories, universities can create diverse, practice-oriented learning scenarios that foster inquiry-based learning in authentic contexts. Additionally, universities should establish AI ethics standards and data governance mechanisms to ensure a safe and sustainable technological environment for innovation literacy development.

At the Teacher Level: Enhancing AI Pedagogical Literacy and Innovation Guidance Ability Teachers should shift from being "knowledge transmitters" to "learning designers" and "innovation facilitators." Universities should strengthen faculty training in AI-based teaching and data literacy, enabling teachers to guide students in rational and ethical use of AI tools. Teachers should emphasize critical reflection on AI-generated content, encouraging students to develop critical thinking, ethical awareness, and academic integrity.

At the Student Level: Strengthening Human–AI Collaboration and Independent Innovation Awareness Students should establish correct attitudes toward technology use, acquire foundational knowledge of AI tools, and enhance information literacy and innovation consciousness. In academic and research activities, AI should serve as an assistant rather than a crutch, encouraging independent inquiry, critical thinking, and creative exploration. Through continuous reflection and practice, students should cultivate creative thinking, ethical judgment, and social responsibility, transforming from "tool users" to "innovation protagonists."

At the Government Level: Improving Policy Support and Institutional Safeguards Education authorities should develop national strategies for AI in education, enhance AI infrastructure and equitable access to digital resources, and promote inclusive innovation education. Moreover, the government should establish AI ethics standards and monitoring mechanisms to prevent data misuse and ethical violations. It should also support university–industry partnerships to create demonstration projects for AI-based innovation education, fostering a "government–industry–academia–research" collaborative model for talent cultivation.

In conclusion, generative AI brings unprecedented opportunities and challenges to the cultivation of university students' innovation

literacy. Only through multi-level coordination among universities, teachers, students, and government can the healthy integration of AI and innovation education be achieved—enhancing the quality of talent cultivation and supporting China's strategy of technological self-reliance and innovation-driven development.

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