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ON POTENTIAL NEGATIVE IMPACTS OF DEFECTS IN MACHINE CREATIVITY OF GENERATIVE ARTIFICIAL INTELLIGENCE ON EDUCATIONAL SUBJECTS

Li Ruohan[1], Chen Sushu[2] and Ju Meng*[3]

[1 2]National University of Defense Technology, Changsha City, 430072, P.R. China
[3]*Hubei University of Technology, Wuhan City, 430068, P.R. China

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ABSTRACT

The integration of generative artificial intelligence (AI) technology into the educational process has become a prevailing trend in today's higher education. As a crucial arena for knowledge innovation and talent cultivation, universities should be vigilant about the profound application risks triggered by the lack of hierarchical creativity in generative AI while actively embracing the convenient services it brings. From the perspective of the internal logic, algorithmic mechanism, and output performance of generative AI technology, it is essentially an advanced analytical and processing tool focused on the syntactic level. There is still a gap between the creativity it represents and genuine human creativity. Over - reliance on this flawed creativity model may inhibit the stimulation of individuals' high - order creativity and trigger anxiety about the replacement of creativity. The cognitive pitfalls hidden behind this technology may ultimately lead to ethical and moral crises such as the alienation of value judgment. The primary strategy to address the above - mentioned risks is to clarify the functional positioning of humans and technology. In the environment of human - machine co - creation, emphasis should be placed on the stimulation mechanism of high - order creativity. A dynamic and flexible institutional norm that buffers risks should be established, and the AI literacy of teachers and students should be continuously improved.

KEYWORDS: Generative artificial intelligence, Machine creativity, educational subject

1. INTRODUCTION

In recent years, the information retrieval and knowledge generation capabilities of generative artificial intelligence have become increasingly remarkable. Generative technology models represented by DeepSeek and ChatGPT are gradually being integrated into the higher education system. With the accelerated iteration and in - depth penetration of intelligent technologies, there are many technological optimists who regard the creative potential of generative models as the “universal key” to solving the complex and multi - dimensional problems in the current higher education field. Some even predict that the core functions of teachers in the higher education system will be comprehensively reshaped or even replaced.

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Many scholars believe that technological progress is the core driving force for social development, and its impact is irreversible and inevitable. Under this logic, they think that the rapid development of generative artificial intelligence is regarded as an inevitable trend, and its powerful information retrieval and knowledge generation capabilities are considered to fundamentally change the teaching models and knowledge transfer methods in higher education. It is true that generative artificial intelligence, as an efficient educational tool, can significantly improve teaching efficiency through automation, personalization, and intelligence, and solve problems such as uneven resource allocation and single teaching methods in traditional education.

However, the views of technological optimists ignore the complexity and diversity of education as a social activity. The goal of higher education is not only the acquisition of knowledge but also the cultivation of students' creativity, critical thinking, and social responsibility. Although generative artificial intelligence shows creative potential in some fields, its creativity is still limited within the framework of algorithms and data and cannot truly replace the unique value of human beings in innovation and critical thinking. More importantly, education is an activity highly dependent on interpersonal interaction. The interaction between teachers and students is not only a carrier for knowledge transfer but also an important part of the students' socialization process. The intervention of generative artificial intelligence may weaken this interaction, making the educational process more mechanized and de - humanized.

By analyzing the internal logic, algorithm mechanism, and knowledge representation method of generative technology, we can find that no matter how far the current generative technology has developed, it is still an advanced processing and analysis technology at the syntactic level of knowledge. The creativity it represents is far from real human creativity. Over - relying on this low - level creativity output will not only hinder the stimulation of individuals' high - order creativity but may also further trigger a series of ethical and moral problems.

Given that the important mission of higher education lies in talent cultivation and knowledge innovation; to deal with the risks of generative technology, we need to go beyond the limitations of instrumental rationality, construct a dynamic and flexible governance framework, and continuously improve the technological cognition and application abilities of educational subjects to ensure that artificial intelligence always helps human growth during continuous iteration.

2. DEFECTS IN MACHINE CREATIVITY OF GENERATIVE ARTIFICIAL INTELLIGENCE

Creativity is commonly defined as the ability to generate novel and valuable ideas, products, or solutions. Traditionally, creativity has been regarded as a unique human trait, closely associated with emotions, intuition, cultural background, and individual experiences. However, with the advancement of artificial intelligence technology, especially the emergence of deep learning and large - scale language models, machines have begun to exhibit what seems like "creative" capabilities, being able to generate content with novelty, such as text, images, music, and even designs. This ability has

prompted people to re - examine the definition of creativity and put forward the concept of "machine creativity".

The background of machine creativity can be traced back to the early exploration in the field of artificial intelligence. In the mid - 20th century, computer scientists started to attempt to simulate human thinking processes through algorithms. For example, Alan Turing's "Turing Test" was an attempt to judge whether a machine had intelligence based on its behavior. However, the capabilities of early machines were mainly limited to logical reasoning and rule execution, and had little connection with creativity. For a long time, "machine creativity" was widely questioned. People believed that machines could only operate according to the permissions given by programmers and follow the programs, and their behavior patterns were highly predictable. It was not until the 21st century, with the breakthrough of deep - learning technology, especially the emergence of generative adversarial networks (GANs) and large - language models (such as the GPT series), that machines began to be able to generate highly complex and seemingly original content. This ability has transformed "machine creativity" from theoretical discussion to practical application.

Generative technology models represented by DeepSeek and ChatGPT seem to have broken through human settings. Compared with traditional artificial - intelligence architectures, generative artificial intelligence has achieved a paradigm shift from passive execution to active creation. It can produce diverse and innovative content according to preset input conditions, covering various forms such as text writing, image drawing, video, and audio synthesis. Given its extremely strong creative potential, some optimists about generative technology have launched a full - scale counter - attack against traditional views. They equate machine generation with human creation and loudly promote the wide application of machine creativity. In fact, this view has fallen into the cognitive trap of "technological fetishism". It ignores the biological and neurological basis of human creativity and confuses the essential differences between algorithmic emergence and conscious initiative. In the special field of higher education, which aims at talent cultivation and knowledge innovation, this cognitive trap regarding generative technology tools needs to be particularly guarded against. Due to the particularity of the types and components of creativity, existing generative models have indeed achieved a certain degree of creativity. However, only after in - depth analysis of the essence of human creativity and the generation logic of generative artificial intelligence can a reasonable definition be made.

Creativity generally refers to the ability to produce novel, surprising, and valuable ideas or products. Based on this, a group of foreign experts in the philosophy of artificial intelligence advocate conducting psychological and phenomenological analyses on the key element in the definition of creativity, namely, the surprising novelty, to clarify the essential connotation and different types of creativity. Among them, the most influential is the philosophical thought on creativity put forward by Margaret Boden. From a phenomenological perspective, there are obvious differences in people's intuitive feelings when exposed to different creative works. Boden stated that, according to the degree of surprise, creativity can be classified into three types from the lowest to the highest level: combinatorial creativity, exploratory creativity, and transformational creativity.

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Combinatorial creativity involves recombining known ideas in non - traditional ways. Its core mechanism lies in establishing direct connections between ideas that were previously only indirectly related. Exploratory creativity is a form of creativity that emerges after in - depth exploration of a conceptual domain. A conceptual domain is shaped by a series of defining rules, which are often implicit. Any mental structure generated based on these rules conforms to the established pattern. New ideas put forward within this mental framework are not only highly innovative but also can serve as general examples of a new category of ideas, inspiring changes in other ideas within the same conceptual domain and expanding the original boundaries of possibility.

Transformational creativity is the essence of human creativity and is a product that further develops on the basis of exploratory creativity. This kind of creativity is manifested when an individual, after reaching a certain stage in exploring a conceptual domain, begins to reflect on and evaluate its own potential and limitations, and then adopts specific strategies to attempt to reconstruct the conceptual domain in order to break through the existing limitations. Transformational creativity does not create something out of nothing but achieves transformation by adjusting or revoking one or more basic constraints in the conceptual domain, thereby giving birth to new ideas that cannot be foreseen in the original conceptual domain. The more thoroughly the original constraints are changed, the more shocking the new ideas produced will be.

Generative artificial intelligence technology uses deep - learning algorithms and architectures to generate novel, diverse, and refined content by simulating the human creative thinking process. The core of generative technology consists of deep neural networks and probabilistic statistical models. During the model - training process, it uses massive datasets for supervised or unsupervised learning and continuously adjusts the model parameters according to real - time feedback, enabling it to gradually master the probability distribution characteristics and internal laws of the data. This non - linear multi - layer mapping mechanism endows the generative model with a certain degree of autonomy, allowing it to extract relevant features from the original data and conduct effective representational learning. On the other hand, probabilistic statistical models can generate a large amount of realistic new data by capturing the internal structure and relevant distribution characteristics of the data. Generative artificial intelligence also includes a reinforcement - learning module, which can achieve continuous learning according to the selected reward functionality and optimization strategy during the specific generation process, continuously optimize its own performance, and handle a wide variety of complex task scenarios in continuous iterations.

From the perspective of the creative realization mechanism of generative technology, it can fully encompass combinatorial creativity. The recognition of massive data and the statistical analysis of probability distribution are actually the rearrangement and optimization of existing data combinations. As for exploratory creativity, although generative models can explore and output creative content within a predefined scope, they still rely on the data “feeding” by programmers and pre - set rules. In this process, the models lack the subjective experiential feelings and aesthetic preferences of humans, so they do not possess true exploratory creativity, let alone transformational creativity.

The root cause is that generative technology models mainly lack three creative characteristics of humans:

Firstly, autonomy. Generative models can never break away from the datasets and algorithm architectures preset by programmers. They cannot make flexible adjustments according to changes in the environment or personal subjective needs like humans. In essence, humans can make decisions or take actions based on their internal goals, while the actions of generative artificial intelligence are completely based on pre - established algorithm frameworks and follow external instructions.

Secondly, embodiment. The "perception" of the physical world by generative artificial intelligence technology models is nothing more than a series of digital signals, which rely on the pre - recording by programmers or real - time capture during the generation process. Admittedly, these signals do present the physical world to a certain extent, but they are far from the rich, dynamic, and personalized human perception. The interaction between humans and the environment is a continuous, dynamic process that evolves step by step in practice, and this process is inseparable from the functions of the body. In contrast, the interaction between generative models and the real world is discrete and static.

Thirdly, intentionality. Intentionality is an important concept in the philosophy of mind, referring to the aboutness and directness of the mind. In the field of artificial intelligence, intentionality is reflected in the ability of intelligent systems to accurately identify and locate specific goals, intentions, or situations. In the construction of current generative models, intentionality remains a major challenge. In daily human - machine interactions, generative artificial intelligence often has difficulty intuitively perceiving the user's emotions and real intentions, resulting in a deviation between its responses and what the user has in mind. Especially in cross - cultural and cross - language interaction scenarios, the problem of the lack of intentionality in generative artificial intelligence is even more serious.

Currently, generative models can only represent combinatorial creativity and limited exploratory creativity. However, the main goal of higher education in China today is not the integration and dissemination of knowledge. Instead, its focus lies in cultivating innovative talents with high - level creativity. If these flawed creativity models are applied without discrimination in the field of higher education, it may exacerbate the potential tension between technology and humanities and trigger a series of profound risks.

The essence of transformational creativity is to break through the constraints of existing conceptual domains and achieve fundamental changes in a certain field through critical reflection and systematic reconstruction. To achieve this, individuals need to conduct cross - dimensional examinations based on their own knowledge structure systems. At the same time, they should have the vision and thinking patterns of cross - disciplinary fields, be able to deeply integrate different disciplinary methodologies and even value systems with their own learning experiences, continuously optimize the pre - structure of cognition, and analyze new things. Einstein's theory of relativity is a classic example of exerting transformational creativity. He did not confine himself to the logical framework established by his predecessors in physics. Instead, he reconstructed basic concepts such as time and space, completely subverting the traditional cognitive model of physics. Such innovations often stem from researchers'

philosophical reflections on the fundamental assumptions of disciplines and the inspiration leaps generated by the collision of cross - domain knowledge.

In today's era of intelligent technology, the important mission of higher education is to stimulate students' transformational creativity through professional, scientific, and systematic teaching and continuously improve the level of knowledge innovation. Moreover, as an important dimension of higher education, ethical value guidance also relies on humans' unique ability of contextual judgment. In the aspect of ethical value guidance, although generative artificial intelligence can generate normative expressions that comply with moral and ethical standards, it cannot capture humans' emotional judgments in specific situations, and it lacks the practical wisdom to weigh the pros and cons and avoid conflicts in specific contexts.

In conclusion, when humans overly rely on generative artificial intelligence in higher education, they are essentially weakening the core function of higher education in stimulating human high - level creativity, thus planting many hidden risks.

3. IMPACTS OF DEFECTS IN MACHINE CREATIVITY ON EDUCATIONAL SUBJECTS

Although the combinatorial creativity and low - level exploratory creativity represented by generative technology models bring technological dividends to the integration and dissemination of knowledge, they are insufficient to fulfil the mission of higher education to cultivate high - order innovative talents due to the significant gap between them and human creativity. In fact, the technological and functional limitations of generative artificial intelligence and its widespread application in the field of higher education will inevitably lead to a series of risks. First and foremost is the excessive reliance on technology, which inhibits the cultivation and stimulation of individuals' high - order creativity. When the content output by this flawed creativity model is equivalently replaced with an individual's creative manifestation and given the same application value as human creativity, individuals will inevitably worry about their own survival value, mainly manifested as replacement anxiety about creativity. Moreover, the cognitive traps hidden behind generative technology may trigger ethical and moral crises such as the alienation of value judgment.

3.1 RESTRICTING THE CULTIVATION OF INDIVIDUAL CREATIVITY

Creativity is the essence of human wisdom. Most of the creative achievements of great value in human society stem from the brave exploration and breakthrough changes in the unknown fields. Although generative artificial intelligence can imitate human creativity to a certain extent, due to the lack of creative features such as autonomy, embodiment, and intentionality, the types of creativity it can achieve are quite limited. It is precisely because of humans' special physical functions and personalized and clearly - intended creative features that they can ignite the unique sparks of thinking.

Individual creativity refers to the ability of an individual to propose novel, unique, and effective solutions when facing problems. This ability is not only manifested in the fields of art or science but also widely applied to various situations in daily life. In the educational environment, individual creativity is reflected in the innovative thinking and practical abilities of students and teachers at

different levels. For students, individual creativity is first shown in the active exploration and independent thinking during the learning process. When faced with complex learning tasks, students can use their existing knowledge systems, combine new information and experiences, and put forward unique insights and solutions. For example, in scientific experiments, students can not only complete the experiments according to the established steps but also verify their hypotheses by adjusting experimental conditions or designing new experimental schemes. This kind of innovative thinking can not only deepen students' understanding of knowledge but also cultivate their critical thinking and problem - solving abilities. Moreover, students' creativity is also reflected in interdisciplinary learning, where they can integrate knowledge and methodologies from different disciplines to form new knowledge structures and thinking patterns.

For teachers, individual creativity is mainly reflected in the innovative practices of teaching design and classroom management. In the teaching process, teachers not only need to impart knowledge but also need to design diverse teaching methods and activities according to the individual differences and learning needs of students. For example, teachers can introduce new teaching models such as project - based learning or flipped classrooms to stimulate students' learning interest and creativity. In addition, teachers also need to have innovative abilities in the development and utilization of teaching resources. They can combine modern technological means, such as virtual reality and artificial intelligence, to design more vivid and intuitive teaching contents, thus improving the teaching effect. At the same time, teachers also need to use innovative thinking in classroom management to solve various problems encountered by students during the learning process and create a positive and open learning environment.

In the important field of higher education, which focuses on knowledge innovation and talent cultivation, over - reliance on generative technology will have adverse effects on both students and teachers as the main bodies of education.

For students, on the one hand, although the automatically generated learning resources are convenient and fast, since the generative model does not have autonomy, the content it outputs is strictly affected by the existing framework of machine algorithms. It tends to give standard answers rather than personalized solutions and is difficult to directly produce elements for cultivating students' individual creative thinking. This may reduce students' motivation to explore the real world and their curiosity, which is not conducive to the full development of individual creativity. On the other hand, when students use automatically generated learning resources, they will unconsciously accept the information and thinking orientation preset by the generative technology model algorithm, thus reducing their independent thinking ability and being unfavorable to stimulating critical thinking. If students form a technological dependence, they will gradually shift from being active to passive in the process of ceding power to artificial intelligence. In this process, humans are unconsciously ceding the dominance of thinking, and the thinking subject may shift from humans to generative artificial intelligence, which will, to a certain extent, deprive people of their academic creative thinking ability.

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For college teachers, the wide application of generative models may solidify the classroom teaching mode to a certain extent. The generative model greatly facilitates the teaching preparation process for teachers. The teaching materials automatically generated by the machine, such as lesson plans and courseware, are often accurate in content and beautiful in form. However, these teaching materials are also quite stylized and lack personalized elements. In the traditional teaching model, teachers usually comprehensively consider the individual differences of students in the class when preparing teaching materials and adjust teaching plans in a timely manner based on different classroom feedback. This student - centered teaching concept is beyond the reach of "machine educators." Relying on generative technology for a long time is not conducive to the interaction between teachers and students and "is not conducive to establishing a good teaching relationship." In addition, the application of generative artificial intelligence technology in educational teaching evaluation may have a negative impact on the exertion of teachers' personal abilities and the all - around development of students to a certain extent. Traditional educational teaching evaluation emphasizes teachers' classroom attractiveness and humanistic care ability, while machine - based evaluation mainly relies on data and algorithms. When the generative technology model becomes the main body for evaluating teachers' teaching, the evaluation model may focus too much on the class's academic performance standards and ignore the all - around development of teachers and students. Some researchers believe that this evaluation orientation makes teachers' pay more attention to students' test - taking skills and neglect the exploration of students' creative potential.

3.2 INDUCING CREATIVE DISPLACEMENT ANXIETY AMONG EDUCATIONAL SUBJECTS

Given the continuous rapid development and widespread penetration of generative technologies, some technological optimists predict that they will completely revolutionize the higher - education model in universities and even replace the educational subject status of traditional human teachers. Faced with the high - quality knowledge materials and teaching content provided by machines, many teachers and students do feel that their subjectivity and autonomy in the teaching or learning process have been ignored, and they begin to doubt the value of their own teaching and learning, gradually losing their creative drive. For example, when a university teacher sees a poem with neat antithesis and beautiful artistic conception created by AI, they may feel pessimistic about "the future of literature".

In fact, when the output content of such a flawed creativity model is equivalently replaced with the manifestation of individual creativity and given the same application value as other forms of human creativity, individuals will inevitably worry about their own survival value, which is mainly manifested as Creative Displacement Anxiety (CDA). Creative Displacement Anxiety (CDA) refers to the psychological unease and anxiety that individuals experience when facing the widespread application of generative artificial intelligence and other technologies, due to the replacement or weakening of their creative abilities by these technologies. This anxiety stems from doubts and concerns about one's own creativity. Especially when technologies can quickly generate a large amount of seemingly

"creative" content, individuals may feel that the value of their creativity has been depreciated, or even replaced by technology.

Creative displacement anxiety is different from previous definitions of technological psychological anxiety. It includes a series of emotional, cognitive, and behavioral responses, mainly manifested in the following aspects.

Firstly, there is a loss of personal goal orientation and subjectivity. Since creativity is a core element of human identity, the perception of generative artificial intelligence models taking on creative tasks may drive individuals to question their own self - worth. Secondly, there is the "imposter syndrome". Individuals using generative tools may have the perception that they are not the real creators, thus giving rise to a sense of fraud, even if they have made choices subjectively. Thirdly, there is a decline in motivation. If generative artificial intelligence can create music or literary works more quickly and efficiently than humans, people may question the necessity of their own creation, leading to a decline in creative motivation. Fourthly, there is a weakening of the catharsis experience. With the introduction of generative models, part of the creative process is handed over to algorithms, which inevitably reduces or even completely deprives creators of the ability to release and relieve strong or repressed emotions. Fifthly, there is a decline in skills. Due to the decrease in creative motivation, individuals' creative skills will gradually decline, thus creating a vicious cycle. Sixthly, there is a reduction in artificial resources. The reduction in creative activities means that the number of people pursuing creative careers decreases, which may lead to a decline in the quantity and quality of human artistic resources. As a result, the training datasets of generative algorithms will also be affected, triggering a chain reaction.

In the field of higher education, the impact of creative displacement anxiety on students and teachers is particularly significant.

For students, creative displacement anxiety is first reflected in the deepening dependence on technology during the learning process. Generative artificial intelligence can quickly provide standard answers and solutions. When faced with complex problems, students tend to rely on technology rather than think independently. Over time, students' independent thinking and innovation abilities may gradually decline, leading to self - doubt about their creativity. For example, in thesis writing or research design, students may rely on generative tools to complete most of the work, ignoring in - depth analysis and innovative thinking about problems. This excessive reliance on technology not only weakens students' creativity but also may push them into a passive learning state, causing them to lose the enthusiasm for active exploration and critical thinking. Moreover, creative displacement anxiety may also lead to students' concerns about their future career development. Especially in the context where artificial intelligence is gradually replacing some creative jobs, students may doubt their competitiveness in the workplace.

For teachers, creative displacement anxiety is mainly reflected in the challenges in teaching innovation and academic research. The application of generative artificial intelligence in teaching plan design and courseware production, while improving teaching efficiency, may also make teachers' teaching models

more formulaic and lack personalized innovation. For example, when preparing courses, teachers may rely on generative tools to generate teaching content, ignoring in - depth analysis and targeted design according to students' individual differences. This rigid teaching model not only weakens teachers' creativity but also may affect teaching effectiveness, making the classroom lose its due vitality and appeal. In addition, in academic research, teachers may also face similar anxiety. Generative tools can quickly generate literature reviews, data analysis, etc. To some extent, this lowers the threshold of research, but it may also make teachers' research lack depth and innovation. Relying on technical tools for a long time, teachers may gradually lose their unique insights and critical thinking abilities on research problems, thus affecting the quality of academic achievements.

3.3 CAUSING DATA MISLEADING AND COGNITIVE BIAS

Data misleading of generative artificial intelligence refers to the phenomenon where, due to biases or limitations in the training data, algorithm design, or output process of generative models, the content they generate has problems in accuracy, objectivity, or comprehensiveness, thus misleading users. This kind of misleading may stem from incomplete, biased, or incorrect training data, or the model's inability to fully understand the context or conduct in - depth analysis of complex problems. In the field of higher education, data misleading has a particularly profound impact on students and teachers. It may not only affect the learning effect and teaching quality but also have a negative impact on the rigor and innovation of academic research.

When individuals are accustomed to passively accepting the information and viewpoints provided by generative technology models, their dialectical thinking and reasoning abilities will "remain silent", making it difficult for them to identify or even perceive the fallacies and false information produced by generative artificial intelligence. Generative artificial intelligence can simulate human conversations, provide "generative" responses to questions, and present a high degree of authority. However, its answers often have the characteristics of opacity and non - interpretability. Users can only obtain the final results, knowing nothing about the machine's processing procedures, thinking patterns, and the scientific basis of the answers. Such fallacies often appear in a seemingly reasonable or seemingly realistic form of inference, that is, the so - called hallucinations. Due to this characteristic, the potential risks of generative artificial intelligence are more serious, and the masking effect is more significant. It lacks human wisdom, especially the ability of immediate insight and insightful reasoning. If humans fail to recognize that there are fallacies in the provided conversation data or corpus, generative artificial intelligence can hardly correct the wrong content, and the answers generated based on wrong materials are likely to be wrong. Generative artificial intelligence is based on a large - scale model architecture and realizes the reconstruction and reproduction of physical world information through large - scale dataset training. In this process, its performance is significantly restricted by the scale and quality of the training dataset.

In the field of higher education, data misleading has a particularly far - reaching impact on students and teachers. It may not only affect the learning effect and teaching quality but also have a negative impact on the rigor and innovation of academic research.

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For students, data misleading of generative artificial intelligence is first reflected in the acceptance of wrong or one - sided information during the learning process. Since generative models can quickly generate a large amount of content, when students use these tools, they may accept the output information without discrimination and regard it as authoritative or correct answers. However, if the generated content has data biases or errors, students may form wrong knowledge systems or ways of thinking. For example, when completing assignments or conducting research, students may rely on the data or conclusions provided by generative tools, but these data may not be accurate or comprehensive, resulting in students' research results deviating from the facts or lacking depth. Moreover, data misleading may also weaken students' critical thinking abilities. If students rely on the ready - made answers provided by generative tools for a long time, they may gradually lose the ability to independently analyze and verify information, thus affecting their academic literacy and innovation ability. In addition, although generative technology ensures the coherence of the output content in the macro - structure, it is quite unstable when presenting specific content. In other words, inputting the same prompt words at different time points may produce different output results. However, students' learning process requires the stability of the knowledge structure, and the uncertainty of the content will undoubtedly disrupt the course effect.

For teachers, data misleading of generative artificial intelligence is mainly reflected in the challenges in teaching and academic research. In the teaching process, teachers may use generative tools to design course content or prepare teaching materials. However, if the generated content has data biases or errors, teachers may pass on this wrong information to students, thus affecting the teaching effect. For example, when explaining a certain theory or case, teachers may rely on the data or analysis provided by generative tools, but these data may not be accurate or comprehensive, resulting in students' misunderstanding of knowledge. In addition, in academic research, data misleading may have a greater impact on teachers' research results. Although generative tools can quickly generate literature reviews, data analysis, and other content, these contents may have data biases or errors, resulting in teachers' research conclusions lacking rigor or innovation. If teachers rely on these tools for a long time, they may gradually lose the ability to independently analyze and verify research data, thus affecting the quality and value of academic research.

In addition, the limitations of data and algorithms themselves are prone to causing cognitive biases. On the one hand, generative artificial intelligence lacks intentionality features. In dialogue systems, it generally fails to accurately understand users' true intentions and emotional states, resulting in the generated content not meeting users' expectations. Especially in cross - cultural and cross - language environments, generative artificial intelligence is particularly inadequate in grasping users' intentions. On the other hand, since the quality of generative models directly depends on the nature of the training data, if the data is biased, the models will also be biased. For example, if the training data set of a model only collects the paper data of a specific group, it will be found that the model is unfair when evaluating the papers of individuals from other groups. If the data used to train generative models contains discrimination or biases in terms of gender, race, and religion, then the training of generative models on a large text corpus will reflect these biases in their language output. For students who have

not yet formed a firm value system, some of them do not have the ability to grasp the essence of things and make accurate value judgments. They blindly believe in the output results of generative models. If the information output by the machine is incorrect or the content contains negative, biased, or discriminatory elements, and students lack the ability to identify the generative content, it is very likely to cause great damage to their existing knowledge systems, cognitive structures, and moral and ethical concepts.

4. RISK MANAGEMENT STRATEGIES FOR GENERATIVE ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION

As the main front for cultivating innovative talents, the special mission of higher education institutions in educating people determines the basic strategy for technological risk management. The future model of higher education will undoubtedly be a new ecosystem of human - machine symbiosis. In an era when intelligent technologies are continuously and rapidly evolving, it is clearly unrealistic to completely avoid the risks brought by technology through fixed management strategies. Higher education institutions should adhere to a dynamic approach, constantly and promptly optimizing management strategies based on the latest technological developments and real - time feedback from educational practices.

The potential negative impacts of the lack of creativity in generative artificial intelligence on higher education subjects cannot be ignored, ranging from the restricted cultivation and display of individual creativity, the crisis of the educational subject's status, to ethical and moral issues such as the alienation of value judgment caused by technological cognitive traps. To address this issue, the higher education sector needs to adopt comprehensive measures at multiple levels to ensure that while technology enhances educational efficiency, it does not undermine the creativity and critical thinking abilities of students and teachers. The specific response strategies for higher education institutions should be implemented from three dimensions. Firstly, there should be a correct understanding of the functional positioning of humans and technology in education. Adhering to the principle of putting people first, emphasis should be placed on constructing a mechanism to stimulate high - order creativity. Secondly, a nested risk - buffering system should be established to form a complete institutional chain from risk early - warning to correct rectification. Thirdly, efforts should be made to enhance the "digital and intelligent literacy" of teachers and students to fundamentally avoid the cognitive traps obscured by generative technology.

4.1 CLARIFYING THE ROLES OF HUMAN AND ARTIFICIAL INTELLIGENCE TOOLS IN EDUCATION

In the context of the widespread application of generative artificial intelligence, the teaching and educational work in higher education institutions should adhere to the principle of "putting people first" and clarify the central position of humans in education. Generative technology should play an auxiliary and instrumental role. It is necessary to ensure the principal position of students in learning and emphasize the central position of teachers in teaching, rather than focusing on one aspect at the expense of the other and blindly pursuing educational innovation driven by technology. This role -

division is not only a return to the essence of education but also a necessary measure to cope with the challenges brought about by the rapid development of technology.

From an educational theory perspective, the fundamental purpose of education is to cultivate people and promote their all - around development. Whether it is the "student - centered" concept emphasized by constructivism or the role of "teacher as a guide" proposed by sociocultural theory, they all point to a core: the subject of education is humans, not technology. The wide application of generative artificial intelligence has indeed brought unprecedented opportunities to education, such as the design of personalized learning paths and the rapid processing of large - scale data. However, the advancement of technology cannot cover up its limitations. Generative technology lacks human emotions and creativity, and it cannot truly understand the personalized needs of students or convey humanistic care and value guidance in the educational process. If technology is placed at the core of education, it may lead to the mechanization and standardization of the educational process and even weaken students' critical thinking and innovation ability. Therefore, adhering to the role - division based on the principle of "putting people first" is not only a clear understanding of the limitations of technology but also a commitment to the educational goal.

Although generative artificial intelligence can provide efficient data integration and analysis capabilities, its essence is a tool and cannot replace the unique role of humans in knowledge creation, emotional communication, and value judgment. Therefore, positioning generative technology as an auxiliary and instrumental role is not only a respect for the essence of education but also an effective way to avoid the potential risks of technology.

The response strategies for future higher education should revolve around the principle of "putting people first". Firstly, higher education institutions should clarify the auxiliary position of generative technology and use it as a tool to improve teaching efficiency rather than as the main body of education. In this process, teachers should act as guides and be proficient in using generative technology to explore rich teaching resources for supplementary teaching to promote the all - around development of individual students. For example, teachers can use generative technology to quickly generate teaching resources, but they must conduct in - depth processing and adjustment on this basis to meet the personalized needs of students. At the same time, teachers should guide students to use generative tools correctly, cultivate their information discrimination ability and critical thinking, and avoid excessive reliance on technology.

Secondly, higher education institutions should pay attention to humanistic care and value guidance in the educational process. Although generative technology can provide efficient data analysis, it cannot replace teachers in emotional communication, value shaping, and the cultivation of innovation ability. Teachers are not only disseminators of knowledge but also shapers of students' emotions and values. "As a product of social practice, the human mind must be influenced by social culture and values, thus distinguishing it from animals and having personalized characteristics such as emotions, feelings, values, and cultures." Although generative technology shows strong capabilities in knowledge integration and dissemination, it cannot replace the unique value of teachers in emotional

communication, value guidance, and thinking shaping. Therefore, while introducing generative technology into the classroom, higher education institutions should strengthen professional training for teachers, clarify their role positioning, and minimize the possibility that generative technology overshadows the teachers and weakens their core responsibilities.

4.2 STRENGTHENING THE MANAGEMENT OF TECHNICAL FAILURE RISKS IN GENERATIVE ARTIFICIAL INTELLIGENCE

Due to the hidden, cumulative, and systematic nature of the implicit risks of generative technology, it is impossible to rely solely on pure technological improvement or moral self - discipline. Therefore, to manage risks effectively, it is necessary to establish a well - nested and effective buffer system to form a complete “early warning - correction” path.

Firstly, we have to control the technological transparency. Technological transparency control means that the operation, decision - making, and reasoning processes of artificial intelligence models should be clear, open, and understandable to humans. Generative technology models need to clearly inform users of the types of data collected, how the data is used, and what impact this data will have on their education and lives. This is of inestimable value for promoting user understanding, building trust, and achieving effective management. In the development of contemporary artificial intelligence models, the attribute of the “algorithm black box” hinders people from understanding artificial intelligence systems more clearly and deeply. This “un-explainability” gives rise to two major risks: the lack of accountability in educational decision - making and the hidden spread of cognitive biases. In response, the “algorithm white paper” system requires technology suppliers to provide users with clear technical model architectures, training data, and the underlying logic of model decision - making. The key to institutional innovation lies in breaking the algorithm black box and establishing a clear, open, and understandable evaluation framework, that is, developing interpretation tools for educational scenarios to transform complex statistical inferences into visual teaching suggestions that conform to cognitive laws.

Secondly, we need to guarantee the algorithm fairness. Guaranteeing algorithm fairness means that generative model systems should not discriminate against individuals or groups. Since the application of generative artificial intelligence systems is becoming increasingly extensive and in - depth, and the content they generate has a profound impact on various fields, including higher education institutions, it is necessary to ensure that they do not discriminate against or disadvantage certain groups. Their excellent integration and generation technology should be used to bridge educational gaps, “gradually moving from an over - pursuit of personalized high - quality resources to high - quality resources that are available and accessible to all learners for free choice.” The biases in generative artificial intelligence stem from historical discrimination in training data and deviations in the objective functions of algorithm optimization. Higher education institutions should establish a dynamic monitoring mechanism and set up an ethics review committee composed of educators, sociologists, and technical experts to regularly review the fairness of the outputs of intelligent systems. The monitoring focuses on: the balance of cultural representation (such as the citation ratio of minority

literature), the inclusiveness of disciplinary paradigms (such as the coverage of non - mainstream theoretical schools), and the sensitivity to group characteristics (such as the response to the needs of disabled students). The monitoring results need to be converted into feedback parameters for algorithm retraining to form a closed - loop of "evaluation - correction - optimization."

Thirdly, we should build data ethical constraints. Data ethical constraints are the key defense against privacy leakage and cognitive manipulation. It means that the data collected by generative technology models should not violate laws and regulations and should not involve any sensitive content such as state secrets or personal privacy. When collecting information using artificial intelligence technology, college teachers or students must carefully consider the security and privacy of the data and minimize the collection of unnecessary data. The general provisions of the current "Personal Information Protection Law" are difficult to address the data leakage risks of generative artificial intelligence. Higher education institutions need to formulate a special data classification management system, for example, dividing educational data into public data (such as course outlines), restricted data (such as classroom interaction records), and confidential data (such as psychological assessment results). Generative artificial intelligence is only allowed to access public data and needs to pass through three - level protection of "data desensitization - access control - usage auditing."

4.3 ENHANCING THE AI LITERACY OF UNIVERSITY TEACHERS AND STUDENTS

Traditional digital literacy education has focused on cultivating technical operation abilities. However, in the era of the widespread development of generative technology, the core of literacy education should shift from single - dimensional technical operation to a comprehensive understanding of algorithms. This literacy encompasses multi - dimensional requirements, including grasping the basic principles of intelligent technology, recognizing its wide - ranging applications, understanding its ethical, social, and privacy implications, and comprehending the role of technology in relation to human nature, emotions, and value orientation. The aim is to achieve a rational and productive interaction between humans and technological models.

Currently, generative artificial intelligence has been integrated into various aspects of higher education, scientific research, and teaching management. Therefore, for students and teachers, enhancing "digital - intelligence literacy" not only enables them to use technological tools more efficiently and conveniently, improving their learning and work efficiency, but also continuously stimulates individual potential and promotes the further development of human creativity with the assistance of technology.

Specifically, when applying generative artificial intelligence technology, teachers and students should focus on the following aspects to cultivate their digital - intelligence literacy:

First, they should continuously deepen their understanding of the basic concepts of artificial intelligence and strengthen their learning and mastery of the basic principles and operating mechanisms, including machine learning, neural networks, and data processing. This involves learning and grasping core concepts, which can enhance the intelligence of technology use and the scientific

nature of decision - making. At the same time, they should recognize the potential and limitations of technological systems.

Second, they need to enhance their practical application ability of intelligent technology. They should be able to identify and apply intelligent models in diverse learning and life scenarios, understand the integration paths of artificial intelligence in different fields, improve the efficiency of using intelligent tools and services, simplify operation steps, and optimize the technological ecological experience.

Third, they should strengthen the understanding of the interaction between artificial intelligence and human emotions, that is, improve their "technological emotional quotient". They should pay attention to the influence of personal emotions on the content generated by intelligent systems and the feedback of intelligent systems on personal emotions during the use of intelligent technology, and experience the humanistic care in human - machine interaction.

Fourth, enhancing self - regulated learning ability and maintaining a rational and prudent attitude towards generative technology are the core elements for avoiding the negative impacts of generative artificial intelligence. Some researchers believe that the impact of generative artificial intelligence on college students' creativity is deeply influenced by students' self - regulated learning levels and their awareness of ethical boundaries when using this technology. The self - regulated learning mechanism can not only reduce the abuse of generative artificial intelligence but also effectively mitigate its potential negative impact on college students' creativity.

To better integrate technology into education, teaching, and scientific research and achieve human - machine interaction, college teachers should be more proficient in applying artificial intelligence technology to improve their "digital - intelligence literacy". Firstly, they should use artificial intelligence technology to assist in education and teaching. While enhancing students' knowledge reserve and learning ability, they can develop more attractive and innovative classroom activities. Secondly, they should actively promote the construction of intelligent moral education, deeply explore the social impacts of the integration of science and technology and humanities, and achieve the leadership of mainstream values.

5. CONCLUSION

The generative features of generative artificial intelligence are deeply compatible with the core field of knowledge innovation and innovative talent cultivation in universities. In the future, higher education will surely move towards a new ecosystem of human - machine symbiosis. However, no matter how advanced artificial intelligence models become, we should always regard them as auxiliary tools and not let machines replace the dominant position of humans in education. The author believes that the core application value of generative artificial intelligence lies in reducing the burden of human creation and stimulating genuine high - order creativity. Just as calculators relieve the brain from mechanical arithmetic, generative artificial intelligence takes charge of knowledge integration and pattern exploration in the early stage of creation, allowing the brain to focus more energy on real

innovation. Especially in academic creation, it is necessary to put forward truly novel and valuable viewpoints, rather than simply integrating existing knowledge or viewpoints.

Given the uncertainty of technological development and the gradual integration into educational practice, individual and fixed management strategies or systems will become unsustainable. A dynamic management model should be established based on the characteristics of different stages of technological development and the gradual feedback from educational practice. Specifically, there are three core strategies for dynamic management: First, continuously monitor the application of technology, prevent risks in advance, and avoid post - event remedies. Second, increase the flexibility of the system. Regularly collect real - time teaching feedback data and promptly adjust usage norms. Advanced artificial intelligence technology model teaching demonstration areas can be established within the scope of controllable norms. Third, set up an interdisciplinary collaborative management department. Invite educators, artificial intelligence engineering and technical personnel, and ethicists to jointly formulate management plans. The ultimate goal of dynamic management is to continuously improve the technological cognition and application ability of educational subjects based on continuous system upgrades and social value guidance, ensuring that artificial intelligence always helps human growth rather than replacing humans during continuous iterations.

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