

Reconstructing the Practical Path for GenAI Empowering New Quality Talent Cultivation in Higher Education

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Abstract: *GenAI presents three dilemmas for the cultivation of new-quality talents in higher education speed disconnection, fragmentation of the four chains and imbalance in teacher-student interaction. Based on the "human-centric" co-creation concept, this paper constructs a three-dimensional online and offline educational space, breaks down the barriers between data and demands in industry, academia, research and application, and establishes a human-machine collaborative ternary structure. Through AI blank space, diversified evaluation and shared platforms, it aims to achieve synchronous resonance between technological iteration and the evolution of higher education, providing a systematic pathway for the deep empowerment of talent cultivation in higher education by GenAI.*

Keywords: *Generative Artificial Intelligence, Talent Cultivation, Path Reconstruction*

1. Introduction

The development of GenAI is advancing rapidly, evolving from the paradigm of international large-scale models represented by ChatGPT to the domestically developed DeepSeek architecture. The technological evolution of GenAI has undergone a paradigm shift from "technology introduction" to "independent innovation" with increasing refinement and accelerating iteration speed. Its application in the field of talent cultivation in higher education has moved from instrumental assistance to a new stage of systematic transformation. In the context of the new era, the intelligent cultivation of talents in higher education has increasingly become an important link in promoting technological innovation and national modernization, as well as an inevitable requirement for the digital transformation of education. However, while the rapid iteration of GenAI brings significant opportunities for learning time and space in talent cultivation within the education field, it also brings challenges such as lack of synchronization in speed, uneven development, and imbalance in teacher-student interaction. Therefore, how to grasp the era's requirements for cultivating new-quality talents centered on the paradigm innovation of GenAI, how to integrate societal talent demands into the practical process of cultivating new-quality talents, and thereby pioneering innovative paths for GenAI to empower the cultivation of new-quality talents, are urgent questions that higher education institutions must answer.

2. Literature Review

Reviewing previous literature, research on talent cultivation in higher education in the digital intelligence era mainly focuses on coupled evolution, digital transformation, paradigm innovation, and path reconstruction. (1) Coupled Evolution of GenAI Empowering Talent Cultivation in Higher Education. In the era of intelligent education, the wave of change brought by GenAI is unstoppable. Technological innovation is leading to structural changes in the paradigm of talent cultivation in higher education^[1]. Research in the education field concentrates on artificial intelligence, personalized development, and interdisciplinary thinking, showing trends of digitalization and diversification^[2]. The widespread application of GenAI provides a logical foundation for deep coupling in talent cultivation in higher education. Based on large data models, it effectively integrates educational resources and industry needs according to the requirements of talent cultivation objectives, promoting the coupled evolution of talent cultivation in higher education^[3]. (2) GenAI Driving the Digital Transformation of Education. Generative Artificial Intelligence continuously promotes the digital transformation of education by permeating multiple dimensions such as educational scenarios, paradigms and ecology^[4], providing transformation ideas for talent cultivation in higher education. On one hand, GenAI

possesses powerful data processing capabilities, offering more scientific and precise data support for decision-making in talent cultivation^[5]. On the other hand, utilizing generative technology tools can effectively stimulate students' diverse learning in the intelligent field, promote teachers to exert their intrinsic value, and open up channels between GenAI and the internal mechanisms of teaching^[6], driving innovation in the educational ecology. (3) Demand-Driven Paradigm Innovation and Path Reshaping. With the rapid development of internet technology in the digital economy era, various AI-empowered new ecosystems for talent cultivation in higher education continue to grow and iterate. The cultivation of top-notch talents in higher education should also keep pace with the times to achieve high-quality development^[7], promote the renewal of educational concepts and the transformation of models, inject new vitality into the reconstruction of the education system and the enhancement of governance capabilities^[8], and encourage proactive exploration and practice among university students. This is not only an inevitable choice for adapting to paradigm innovation and promoting the digital transformation of education but also an urgent task for exploring innovative paths in talent cultivation^[9].

3. Current Situation and Challenges of GenAI Empowering Talent Cultivation in Higher Education

With the rapid development of educational integration and Generative Artificial Intelligence technology, the cultivation of new-quality talents is undergoing profound changes. The era requires that the cultivation of new-quality talents focus on the training of innovative thinking, lifelong learning thinking, human-machine symbiotic thinking, and holistic thinking, necessitating substantive transformation to address the risks and challenges brought by the digital transformation of talent cultivation in higher education. At the same time, higher education institutions still face many constraints and issues related to structural and conceptual shifts in the cultivation of new-quality talents. There is an urgent need to systematically review the existing teaching systems and models, deeply analyze the limitations of the current talent cultivation models in higher education and the new requirements posed by Generative AI for new-quality talents, so as to provide a theoretical basis for subsequently constructing the reconstruction of the practical path for GenAI empowering talent cultivation in higher education.

3.1 Accelerated Iteration Speed, Urgent Need to Transform the Value Concept of the Educational Original Intention

(1) Technological Dimension: The Speed of Educational Adaptation Cannot Keep Up with the Iteration Speed of Intelligent Technology

The continuous updating and iteration of Generative AI technology is profoundly changing the talent cultivation models in higher education, posing higher requirements. Teachers must update the teaching system in real-time to adapt to the digital transformation of education. On one hand, the popularization of intelligent teaching tools and online course management platforms means that the traditional "lesson plan preparation" is no longer suitable for the new-quality talent cultivation paradigm proposed by existing technologies. The disconnection phenomenon of "teaching old tools while using new models" is prominent. Students' understanding of AI tools remains at the level of "assisted generation" and there are ethical risks associated with their essential cognition of AI-led learning. On the other hand, the assessment system is gradually shifting from "knowledge" evaluation to "knowledge + literacy" evaluation, requiring students to understand and apply professional knowledge through exploration, experience, and practice, thereby enhancing professional skills and eliminating the over-reliance on result-oriented evaluation systems in higher education. Therefore, the transformation of the higher education teaching system and assessment system is key to the speed of educational adaptation and fundamental to solving the problem of "lagging updates" that are difficult to match with industry needs.

(2) Value Dimension: Imbalance Between the Educational Original Intention and the Use of Intelligent Tools

The teaching environment in the digital age has broken through the traditional classroom space. Teaching forms have transformed into an intelligent education application ecosystem. Talent cultivation in higher education is shifting from isolated, single applications to shared, intelligent platforms, bringing more flexibility to teaching but also leading to an imbalance between the educational original intention and the use of intelligent tools. Some universities alienate intelligent

tools into "efficiency enhancers" and students become more reliant on standardized answers provided by AI which to some extent, erodes students' critical thinking, neglects its value, and deviates from the original intention of cultivating new-quality talents. Meanwhile, students regard AI as a tool to substitute thinking, which contradicts the educational philosophy of trial and error, reflection and growth. Driven by quantifiable data, universities unconsciously let technology replace the essential requirements of scientific and technological education, and the original intention of education is passively ceded to the one-way logical thinking of faster and cheaper.

3.2 Prominent Gap Situation, Should Break the Dilemma of Four-Chain Fragmentation in the Educational Path

(1) Spatial Structure Fragmentation: Low Integration Among Schools, Enterprises, Government and Research Institutions

As the main task of higher education, the cultivation of new-quality talents has distinct cross-border and integrative characteristics. It must not only cultivate high-quality composite talents needed by society but also keep pace with technological changes in industry and research institutions to cultivate new-quality talents with innovative thinking and high-level skills. Currently, higher education is still in the traditional mode of single-skill output. The integration of schools, enterprises, and research institutions remains at a superficial level of "presentation + internship," leading to significant differences in teaching forms and methods, low conversion rate of teaching and research knowledge, and a lack of channels for co-construction, sharing, and co-evaluation of knowledge and skills. Faced with the entry of new concepts and technologies into university classrooms, problems such as undefined red lines for data security, inconsistent interface standards for computing power among enterprises, government, and research institutions, and inefficient collaboration between the teaching system and intelligent computing power platforms are prominent.

(2) Demand Mechanism Fragmentation: Mismatch Between Diversified Demands and Technological Iteration Updates

To comply with the transformational trend of Generative AI, university teaching must be demand-oriented, building an integrated, intelligent and digital teaching collaboration platform that highlights the demand orientation of talent cultivation. However, there are demand barriers between students' personalized learning resources and enterprises, government, and research institutions. The integration of industry and education is not synchronized with the talent cultivation process, and the mismatch between enterprise generation models and school teaching models is prominent. There are barriers between the model algorithm technology of research institutions and the knowledge transformation of teaching practice. Talent flow still focuses on one-way channels, collaborative education projects are marginalized, and university-enterprise cooperation lacks the initiative for joint investment, co-management, and risk sharing, leading to widespread superficial cooperation phenomena, making it difficult to form a new ecosystem for talent cultivation in higher education that is demand-stable and sustainable in the long term.

3.3 Imbalance in Teacher-Student Interaction, Must Promote the Transformation and Innovation of Teacher-Student Intelligent Collaboration

(1) Teacher Role Imbalance: Transformation of Teaching Models and Increase in Work Pressure

Teaching models urgently need to adapt to the collaborative transformation of educational digitization and digital education. The traditional teacher-student binary structure is no longer suitable for talent cultivation in higher education. The individual's need for self-realization and social development is not met. The phenomenon of students using AI to generate assignment frameworks is becoming more frequent, forcing teachers' grading standards to follow the model style, and teaching design shifts from goal-oriented to model-oriented. The widespread application of digital tools increases teachers' workload. Traditional teaching methods are insufficient to meet students' questions and feedback anytime and anywhere. The diversification of digital resources places higher demands on teachers for selecting, integrating, and updating teaching preparation materials, directly affecting teachers' rest and personal lives, and consequently impacting teaching effectiveness.

(2) Student Role Imbalance: Over-reliance on Artificial Intelligence Neglecting Classroom Efficiency

With the advent of artificial intelligence technology, students can access knowledge anytime and anywhere. While this brings flexibility and convenience to learning, it weakens students' ability for deep thinking and systematic learning. Students no longer spend long periods focusing on learning and research but instead use AI to output answers with one click, even no longer valuing the establishment and deep understanding of knowledge. When online teaching, virtual classrooms, and other intelligent technologies become hotspots in current higher education, they seemingly bring flexibility to learning but actually hinder students' communication and interaction. Teachers and students rely more on tools such as text, voice and video, lacking face-to-face communication interaction and hands-on practical operation, leading to a serious imbalance in the roles of teachers and students.

4. Reconstruction of the Practical Path for GenAI Empowering Talent Cultivation in Higher Education

4.1 Constructing a New "Human-Centric" Concept under Human-Machine Relationships

In the era where GenAI is bound to have a profound impact on talent cultivation, universities must not only keep up with the iteration speed but also balance the environmental changes of higher education in the intelligent age. On the basis of ensuring the advantages of technical training and inheriting the educational philosophy, they should fully explore the empowering potential of GenAI, shape a new pattern for cultivating new-quality talents, cultivate more new-quality talents with both innovative thinking and practical ability, accelerate the integration of GenAI empowering talent cultivation in higher education, transition from speed catching-up to co-existence and symbiosis, and use technology to return to people, develop people, and transcend people.

Faced with the strong advent of new technology, GenAI is not a substitute nor an efficiency tool, but an amplifier of human agency, which is the ultimate goal of talent cultivation in higher education. First, transform technological lag into co-creative iteration, allowing teachers, AI and students to become the co-creative subjects of the digital transformation of education, breaking the limitations of existing teaching, integrating old tools with new models, and cultivating students' transition from assisted generation thinking to innovative, feedback and upgrade cyclic thinking. Second, change the result-oriented evaluation system, establish a diversified and integrated evaluation system, provide a human-machine co-creative contribution evaluation system, allow students to correct the content output by AI and enable teachers to use AI to provide more appropriate answers, forcing technological iteration and teaching iteration to occur synchronously, and using AI to learn professional knowledge and skills. Third, regard GenAI as a tool to enhance human agency, a means to enhance human autonomy, and a method to stimulate human creativity, fully leverage the subjective initiative of teachers and students, use technology to stimulate human creativity, ensure that the chain of trial and error, reflection, and growth is not short-circuited by technology, and reposition critical thinking, ethical judgment, and creative breakthroughs at the center of talent cultivation in higher education.

4.2 Creating a Three-Dimensional New Educational Space of "Industry-Academia-Research-Application"

On one hand, guided by industrial development, construct a practical space combining online and offline. The digitization and multi-model interaction capabilities of GenAI promote the application of enterprise professional knowledge to the teaching scenarios of talent cultivation in higher education, making industry-level and research-level complex skills accessible in the classroom, and transforming the shallow "presentation + internship" model into a "learning + practice + application" model. Furthermore, a collaborative platform for the co-creation, sharing and joint evaluation of knowledge and skills should be established. It will forge an innovative paradigm of in-depth integration among universities, enterprises, governments and research institutions featuring synchronized task execution, unified data sources and consistent evaluation criteria, fundamentally resolving the fragmentation of spatial structures at its root.

On the other hand, we should break down demand barriers between universities, enterprises, governments and research institutions, advance the transformation and practical application of scientific research achievements, and build a new talent cultivation ecosystem where the talent chain, industrial chain and technology chain integrate with and reinforce one another. An integrated university teaching organizational system underpinned by generative AI technology shall be constructed to facilitate the dissemination of professional expertise derived from industrial revolutions and corporate

innovations into university talent training. This enables enterprises to upload real-time job task streams to talent demand pools and allows research institutions to map computing power onto classroom teaching, turning practical knowledge generated through industry-university-research application collaboration into structured plans for teaching restructuring. Leveraging artificial intelligence technology to facilitate two-way resource flow among universities, enterprises, governments and research institutes, we can eliminate the disconnect between the demands of school-enterprise partnerships and research institute-university cooperation, and evolve all stakeholders into a digital twin community.

4.3 Reconstructing a New Model of Human-Machine Collaborative Education

In the digital intelligence era, communication and interaction between teachers and students are particularly important. They are not only knowledge transmitters but also bridges for talent cultivation. Therefore, it is necessary to make the teacher's role shift upwards towards concentrated interaction, and the student's role shift towards strengthened self-discipline and initiative, fundamentally solving the problem of role imbalance.

First, transform the traditional teacher-student binary structure into a teacher-student-machine ternary structure, helping individuals achieve self-value satisfaction and social development needs, improving the efficiency of talent cultivation in higher education through technological empowerment, strengthening students' independent thinking ability, and transforming the teaching design model. Teachers give full play to their advantages in educational technology, improve their digital technology application ability, and enable students' questions and feedback to be efficiently completed in the classroom. Second, set "AI blank space" tasks to avoid students' reliance on AI output answers, promote face-to-face problem-solving and practical innovation methods, re-operate and deduce hands-on, reshape deep thinking and teacher-student interaction, build the logical starting point of the teacher-student community, promote in-depth dialogue and communication, and guide students to conduct deep analysis and exploration, which is the foundation for cultivating new-quality talents in higher education.

5. Summary and Outlook

Faced with the changes brought by Generative AI technology, we need to learn to actively recognize changes, proactively adapt to changes, and scientifically seek changes, improve the talent cultivation system in higher education, build intelligent and digital education, make good use of new artificial intelligence tools, and change the ways of talent cultivation in higher education. This paper systematically reviews the evolution context of GenAI empowering talent cultivation in higher education, pointing out that the main current bottlenecks are the mismatch between the ultra-fast update of technology and the lag of the educational system, the fragmentation of spatial structure, the mismatch of demand mechanisms, and the imbalance of teacher-student roles. To address these challenges, this paper proposes reshaping the value orientation with the concept of co-creative iteration, breaking down the data, scenario, and evaluation interfaces between schools, enterprises, government and research institutions through the three-dimensional space of industry-academia-research-application, restoring deep thinking and face-to-face interaction through the ternary collaboration of teacher-student-machine and the AI blank space mechanism, and achieving element mutual recognition and risk sharing through tools such as diversified contribution evaluation and computing power vouchers, forming a closed loop where technological iteration and teaching evolution are synchronized.

In the future, we should deepen the construction of educational supercomputing nodes, adhere to the original intention of education, give play to the leading role of teachers, promote the connection of the three levels of micro-classroom, meso-platform, and macro-governance, strengthen teachers' digital teaching training and students' meta-cognitive training, achieve dynamic matching of the talent chain, industry chain, and technology chain, and provide theoretical and practical support for building a sustainable and scalable new ecosystem for GenAI education.

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