

Innovations and Challenges of AI-empowered Career Education for College Students

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Abstract: Amid the rapid advancement of AI technology, career education for college students urgently requires transformation. Generative AI offers a novel approach to innovating career education: personalized career planning is achieved through precise profiling systems based on big data, learning experiences are enhanced via immersive scene reconstruction (such as virtual simulation technology), and traditional didactic methods are supplanted by coaching guidance to foster students' independent exploration. AI-driven career education encounters significant challenges, such as data privacy and ethical concerns, algorithmic bias leading to compliance issues, and threats to educational equity due to unequal distribution of technical resources. Future career education must balance technological advancement with humanistic values, leveraging AI's efficiency and intelligence while maintaining a "people-oriented" educational approach. This balance aims to nurture well-rounded individuals who possess both professional expertise and social responsibility.

Keywords: AI empowerment; Career education innovation; Generative artificial intelligence; Ethical risk; Algorithm compliance

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1. Introduction: The urgency of the transformation of college students' career education in the AI era

The rapid development of artificial intelligence technology is profoundly reshaping the global occupational ecosystem and the logic of talent cultivation. According to the prediction of the McKinsey Global Institute, by 2030, nearly 375 million workers worldwide will face career transformation, among whom cognitive abilities and social-emotional abilities have become the core competitiveness of workplace professionals^[1]. Against this backdrop, the career education system in universities is facing unprecedented shocks and challenges: the traditional standardized and group-oriented guidance model struggles to meet the personalized and dynamic career development needs driven by AI. In traditional career education, the formulas of career planning theories

are applied rigidly, resulting in a “one-size-fits-all” planning path. The content of career education lags behind the pace of industrial transformation and can no longer meet the current needs of university students.

In the face of these challenges, major domestic universities are carrying out exploratory work on empowering career education with artificial intelligence. Wang Huifeng, the vice-president of East China University of Science and Technology, pointed out that “AI should neither be regarded as a ‘tool appendage’ nor allowed to become the ‘dominant force.’ Instead, with ‘educating people’ as the core, we should break down barriers through interdisciplinary training models, consolidate the foundation with a hierarchical curriculum system, and improve efficiency with intelligent platforms, ultimately achieving the unity of ‘value guidance’ and ‘technological empowerment’.”^[2] This concept encapsulates the prevailing perspective of many leading domestic universities regarding AI technology’s role: technological empowerment should prioritize educational core values. Thus, this paper examines the transformation pathways, key challenges, and future directions for career education in the AI era, drawing from an analysis of innovative practices at various domestic universities.

2. Innovative practice of career education driven by generative artificial intelligence technology

Artificial intelligence is categorized into Analytical and Generative AI. Generative AI warrants particular attention due to its capability to autonomously produce content like text, images, videos, and audio through various algorithmic models. Additionally, it can refine its outputs by learning from user feedback^[3]. Incorporating generative AI into career education enables the simulation of real-life occupational scenarios for students, allowing them to experience various work environments virtually and gain insights into potential career paths. Furthermore, generative AI can generate personalized career exploration reports tailored to students’ interests, skills, and aptitudes, recommending majors and career trajectories that align with their development. Many universities are actively exploring the use of generative AI to enhance career education.

2.1. Precision career portrait system based on generative artificial intelligence

Generative artificial intelligence revolutionizes career planning by creating dynamic talent profiles through multi-source data integration, moving beyond traditional methods reliant on subjective assessments and personal data. This shift enables personalized, one-on-one career guidance. At Northwest A&F University, an AI-driven growth record system has generated ability profiles for over 10,000 students, combining professional course grades, general skills, and career interest evaluations into six major categories with over 30 detailed indicators, forming a quantitative “talent map.” Additionally, the system employs large-model algorithms to daily extract recruitment data from over 300,000 enterprises nationwide, storing it in a “demand database.” This facilitates precise two-way matching between the talent and demand databases^[4].

Not only are universities beginning to leverage generative AI to build a precise career profiling system, but primary and secondary schools are also starting to introduce new technologies to empower career education. The Education College of Minhang District in Shanghai has implemented a system that creates personalized career profiles for 1,396 Grade 10 students from seven high schools and 3,405 Grade 6 students from 15 junior high schools. This system analyzes students’ interests and inclinations in junior high and evaluates professional positioning in high school, offering comprehensive career development services across educational levels.

2.2. Reconstructing the learning experience through immersive scenarios

The integration of virtual reality (VR) and augmented reality (AR) technologies provides an interactive and experiential approach to conceptualizing career trajectories. For instance, the “Career Blind Box” project at Chongqing Technology and Business University allows students to input keywords related to their interests, which then automatically generates dynamic reports detailing job requirements and potential development paths. Additionally, the “Career Portrait Generation” system transforms students’ 15 ability items into personalized 3D character models, enabling them to visually conceptualize how their abstract career plans may materialize.

The “Business Career” program at Southwestern University of Finance and Economics integrates disciplinary characteristics with innovative scenario-based learning. The university leverages digital resources, including simulated banks, securities laboratories, and VR environments, to create a business world that closely mirrors reality. Furthermore, over 30% of the career-related curriculum comprises practical instruction. The teaching process incorporates diverse methods, such as job-hunting training camps, corporate open days, and entrepreneur-led classroom lectures, to seamlessly connect in-class and out-of-class learning. This comprehensive approach achieves a complete closed-loop integration of the “Business Career” program ^[5].

2.3. Replacing one-way indoctrination with coaching-style guidance

The core innovation of AI-based career consulting lies in shifting from providing prescriptive answers to stimulating students’ independent thinking and self-discovery. The “Awu” career planning AI system, developed by Southwest Jiaotong University, exemplifies this approach. Grounded in an interdisciplinary knowledge base spanning career studies, computer science, psychology, and linguistics, “Awu” represents a significant departure from traditional trait-factor theories of career development. Theoretically, it is underpinned by the dynamic concept of career adaptability, rather than static trait-matching. In terms of consulting methods, “Awu” employs a coaching approach, eschewing directive advisory models in favor of Socratic questioning to promote students’ self-awareness and autonomous decision-making. The system’s underlying logic is centered on facilitating students’ own reflections, rather than providing prescriptive recommendations ^[6].

The “Know-it-all” intelligent Q&A system developed by the Zhejiang Business Technology Institute has expanded its capabilities beyond factual information retrieval. By integrating the large-scale DeepSeek-R1 model, the system can now provide students with personalized academic and career development recommendations based on their majors, extracurricular activities, and internship experiences. When addressing queries about transitioning from junior college to undergraduate studies, the system not only links relevant learning resources but also mobilizes appropriate psychological support services, thereby achieving a synergistic integration of technological capabilities and humanistic care.

The integration of generative artificial intelligence (AI) in career education offers several distinct advantages. Foremost, it enables a highly personalized approach, allowing for the customization of career planning strategies tailored to the unique circumstances and needs of each student. By simulating authentic professional scenarios, generative AI provides immersive experiences that deepen students’ understanding of various occupations and strengthen their career awareness. Furthermore, the ability of generative AI to rapidly process vast amounts of information empowers students with up-to-date industry trends and career development outlooks, broadening their perspectives and facilitating more forward-looking career planning.

3. Core challenges in AI-enabled career education

The integration of generative artificial intelligence (AI) into career education presents several critical challenges. First, over-reliance on AI-generated content may undermine students' independent thinking and exploration skills. There is a risk of students becoming accustomed to directly seeking AI-provided answers, neglecting in-depth personal reflection and practical investigation. Secondly, data security and privacy protection are paramount concerns. Improper handling of student data during collection and utilization could result in serious breaches, compromising individual rights and interests. Finally, the accuracy and reliability of AI-generated content require rigorous validation. Algorithmic biases may lead to the provision of unreliable or inappropriate career guidance, necessitating careful evaluation of the system's outputs.

3.1. Ethical risks

The primary ethical challenge in AI career systems is safeguarding data privacy. Over-collection of multi-source data, including students' classroom behaviors, social dynamics, and psychological assessments, coupled with improper storage of un-desensitized data, can lead to information leaks and legal violations. During data processing, it is crucial to filter out inappropriate content, such as material inconsistent with core socialist values, as well as discriminatory or prejudiced information. The use of low-quality training data can result in AI systems that perpetuate social biases and produce inappropriate content. Such outcomes not only conflict with core socialist values but also negatively affect college students' career planning ^[7].

3.2. Algorithm compliance risks

Artificial intelligence-generated content (AIGC) involves AI autonomously producing diverse content types by processing extensive datasets. This process compresses vast pre-trained data into a parameter space, where interpolation grants AI a degree of generalization or hallucination, resulting in numerous ambiguities. College students outside the field of artificial intelligence may struggle to discern AI-induced hallucinations, potentially leading to misguided career planning decisions.

3.3. Ensuring educational equity

AI-driven career education lacks sufficient adaptability, particularly in universities located in third- and fourth-tier cities, where a technological application gap persists. The prohibitive cost of local server deployment for AI contributes to the limited reach of AI career platforms in these institutions. Additionally, algorithmic bias leads to digital discrimination. How can we guarantee that AI in career education provides equitable treatment to all students during training, regardless of gender or institutional ranking?

A shortage or quality disparity in training samples can lead to homogenized outputs and inadvertently embed developers' biases. This can result in "algorithmic discrimination", where the system unfairly treats certain groups during data processing ^[8]. A study by Soochow University on Microsoft's chatbot Xiaoice revealed significant gender biases. Introducing such biased algorithms into career education could compromise educational fairness.

4. Conclusion: The dialectical unity of technological empowerment and humanistic core

In the AI era, the core of career education for college students lies in reaffirming and elevating educational

values, rather than simply replacing them with technology. As algorithms handle repetitive tasks, education can refocus on its fundamental mission of nurturing individuals. Educators must enhance their digital literacy and teaching skills, guiding students to effectively and safely harness generative AI, while also mitigating its risks. This approach aims to advance high-quality career education in the age of artificial intelligence.

Universities must prioritize ethical considerations as they advance the application of generative AI technology, creating a career education ecosystem that emphasizes “using algorithms for education and prioritizing student development.” Within a framework of compliant use, AI should genuinely enhance career education, fostering future talents equipped with both innovative capabilities and a strong sense of responsibility.

Disclosure statement

The author declares no conflict of interest.

References

- [1] McKinsey Global Institute, 2017, *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation*. McKinsey and Company, New York.
- [2] Guangming Daily, 2025, The Conference on High-quality Development of Talent Cultivation at East China University of Science and Technology was Held. <https://news.ecust.edu.cn/2025/0718/c160a192096/page.htm>
- [3] Yu GM, Su JW, 2023, Communication Revolution and Media Ecology under the Wave of Generative Artificial Intelligence — From ChatGPT to the Future of the Full-scale Intelligent Era. *Journal of Xinjiang Normal University (Philosophy and Social Sciences Edition)*, 2023(5): 81–82.
- [4] Science and Technology Daily, 2025, Northwest A&F University: AI “Counselors” Assist Graduates in High-efficiency Employment. http://www.kepu.gov.cn/education/2025-07/23/content_374792.html
- [5] Guangming Daily, 2025, Career Education Helps College Students Find Their “Professional Coordinates”. https://news.gmw.cn/2025-07/22/content_38165714.htm
- [6] Ren R, Chen XY, 2025, Southwest Jiaotong University Releases AI Career Counselor Agent “Awu” to Guide Students’ Self-exploration and Growth, *China Women’s News*, 2025-04-16, <https://news.swjtu.edu.cn/info/1012/78645.htm>
- [7] Tang ZY, Xie YJ, 2024, Copyright Infringement Risks and Governance of Data Use in Generative Artificial Intelligence. *China Publishing Journal*, 2024(21): 56–61.
- [8] Zhang YX, 2023, The “Design Protection” of Personal Information in Human-Machine Dialogue — Taking the ChatGPT Model as the Entry Point”. *Library Tribune*, 2023(8): 87.

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