

Research on the “Double-Edged Sword” Effect of University Students’ Employment and the Cultivation Path of Core Literacy in the Artificial Intelligence Era

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Abstract—The rapid development of artificial intelligence (AI) technology is profoundly reshaping the global labor market, creating an unprecedented “double-edged sword” effect on university students’ employment, characterized by the coexistence of “substitution” and “creation”. This paper aims to conduct an in-depth analysis of the differential impact of AI on various industries and positions, pointing out that repetitive, procedural cognitive tasks face the highest risk of being replaced, while fields such as the development, application, and maintenance of AI technology have spawned new growth points for employment. Facing this transformation, the core argument of this paper is that the key to university students’ employment competitiveness has shifted from knowledge reserve to core literacy. The article elaborates on the connotations of three core literacies—critical thinking, creativity, and emotional intelligence—and their decisive role in careers under the new model of “human-machine collaboration”. Finally, it systematically constructs cultivation paths for university students’ core literacy tailored to the AI era from three aspects: higher education reform, student self-improvement, and the social support system.

Keywords—Artificial Intelligence; University Students’ Employment; Human-Machine Collaboration; Critical Thinking; Creativity; Emotional Intelligence)

I. INTRODUCTION

We are in the midst of the Fourth Industrial Revolution, driven by artificial intelligence technology. From AlphaGo defeating human champions to ChatGPT sparking global discussion, AI is no longer a distant concept but a real force permeating all aspects of social production and life. For university students about to enter the workforce, AI presents both opportunities and challenges. On one hand, AI automation may disrupt many traditional white-collar jobs, increasing the risk of “unemployment upon graduation”. On the other hand, AI has also generated a large number of emerging occupations, providing

broader development space for university students. In this context, simply discussing “employment difficulties” is insufficient to cope with the complex situation. The key lies in deeply understanding the new rules of employment in the AI era and accordingly reshaping the direction of higher education and individual development. This paper will start by analyzing the “substitution effect” and “creation effect” of AI, focus on “human-machine collaboration” as the future mainstream work model, deeply explore the core literacies that university students must cultivate, and propose systematic cultivation strategies, hoping to provide theoretical reference and practical guidance for higher education reform and university students’ career planning.

II. “DOUBLE-EDGED SWORD” EFFECT OF AI ON UNIVERSITY STUDENTS’ EMPLOYMENT

The impact of AI on employment is not simply “machines replacing humans” but a structural, dynamic adjustment process.

A. Substitution Effect: Structural Unemployment Risk and Job Reshaping

The substitution effect of AI mainly concentrates on cognitive tasks that are highly repetitive, procedural, and codifiable. Entry-level positions such as financial analysis, legal document review, content translation, routine code writing, and customer service consulting are gradually being efficiently and accurately handled by AI systems. For university students, this means that the demand for many previously considered “stable” major-related positions is shrinking or the skill requirements are significantly increasing.

According to predictions by McKinsey Global Institute (2023), a significant number of existing work tasks globally will be automated by 2030. As shown in Table 1 below, repetitive cognitive tasks like data processing and basic forecasting face the highest automation potential, which constitutes the core work content of many entry-level white-collar jobs, thereby posing a direct structural unemployment risk to university students’ employment.

TABLE 1. PREDICTED AUTOMATION POTENTIAL BY WORK CONTEXT TYPE FOR 2030

Work Context Type	Example Activities	Automation Potential
Repetitive Cognitive Tasks	Data processing, basic information interaction, simple prediction	60%-70%
Non-Repetitive Cognitive Tasks	Complex problem-solving, professional judgment, creative thinking	25%-35%
Repetitive Physical & Manual Tasks	Goods storage, routine equipment operation, product sorting	50%-60%
Non-Repetitive Physical & Manual Tasks	Complex machinery repair, fine manual work	20%-30%

Data source: Compiled based on data from McKinsey Global Institute's working report "Generative AI and the Future of Work"

This substitution is not only a reduction in the number of jobs but also a profound reshaping of job content. For example, accountants no longer need to bury themselves in bookkeeping but need to learn to use AI tools for financial data analysis, risk prediction, and strategic planning. Therefore, the substitution effect essentially imposes an urgent requirement for "skill upgrading" on university students, liberating humans from tedious labor to engage in more valuable work.

B. Creation Effect: Emerging Job Ecosystem and Changing Skill Requirements

Coexisting with the substitution effect is a powerful creation effect. The development of AI has spawned three major categories of employment opportunities:

1) Core AI Layer Employment

Positions directly involved in AI research and development, such as Algorithm Engineers, Machine Learning Specialists, and Data Scientists. These roles require profound mathematical, statistical, and technical expertise and are the arena for top science and engineering graduates.

2) AI Application Layer Employment

Positions that apply AI technology to solve problems across various industries, such as AI Product Managers, Smart Healthcare Consultants, FinTech Analysts, and AI Trainers. These roles require a compound background of "AI + domain knowledge," providing opportunities for cross-disciplinary

development for a large number of non-computer science students.

3) AI Derivative Layer Employment

Emerging service roles arising alongside the proliferation of AI, such as AI Ethics Consultants, Data Privacy Specialists, Human-Computer Interaction Designers, and Prompt Engineers. These positions emphasize insight into the societal impact of technology and humanities/social science literacy.

The creation effect indicates that the future job market will increasingly favor compound, innovative talents who can harness AI and integrate it with specific scenarios. According to the World Economic Forum's "Future of Jobs Report 2023" survey, AI and Machine Learning Specialists have become one of the fastest-growing job categories globally. Simultaneously, a significant number of new jobs are concentrated in the application and derivative fields of AI, showing a trend towards diversification in the employment ecosystem.

TABLE 2. FASTEST GROWING EMERGING ROLES GLOBALLY (2023-2027)

Position Category	Growth Expectation (%)
AI and Machine Learning Specialists	40%
Sustainability Specialists	33%
Business Intelligence Analysts	32%
Information Security Analysts	31%
Fintech Engineers	30%
Data Analysts and Scientists	30%
Robotics Engineers	28%
E-commerce and Digital Marketing Specialists	27%
Talent and Organization Specialists	26%
Service and Solutions Designers	25%

Data source: World Economic Forum "Future of Jobs Report 2023", based on a global survey of 803 companies

III. CORE LITERACY RECONSTRUCTION UNDER THE "HUMAN-MACHINE COLLABORATION" MODEL

In the future, where "human-machine collaboration" becomes the mainstream work model, the unique value of humans lies not in competing with AI in calculation speed and memory capacity, but in leveraging traits that AI does not possess. The following three core literacies form the cornerstone of university students' future employment competitiveness.

A. Critical Thinking: Becoming the "Commander" of AI, Not a "Vassal"

In an era of information explosion and increasingly prevalent AI-generated content, the importance of critical thinking becomes more pronounced. It mainly includes:

1) Questioning and Evaluation Ability

The ability to critically examine information, solutions, and suggestions provided by AI, judging the rigor of their logic, the reliability of data, and potential biases, rather than accepting them wholesale.

2) Problem Definition and Strategic Thinking Ability

AI is good at answering questions, but humans need to be adept at asking the right, profound questions. University students need to cultivate the ability to abstract core problems from complex phenomena and formulate overall strategies for solving them, thereby providing direction for AI.

3) Decision-Making and Accountability Ability

After AI analyzes various possibilities, the final decision, especially those involving ethics, values, and long-term impacts, must be made by humans, who bear the consequences.

Critical thinking ensures that humans remain in a leading and responsible position in "human-machine collaboration."

B. Creativity: Breaking Through the "Paradigm Cage" of AI

AI learns based on existing data, and its "innovation" is essentially the optimization and recombination of patterns. Human creativity, however, can achieve original breakthroughs from 0 to 1. For university students, creativity is reflected in:

1) Interdisciplinary Association and Integration Ability

Combining knowledge and methods from different fields in unexpected ways to generate entirely new ideas and solutions. This is currently difficult for AI to achieve.

2) Aesthetic and Narrative Ability

In fields such as literature, art, and design, human aesthetic taste, emotional expression, and storytelling ability are core to creating warm, engaging works.

3) Foresight and Conceptualization Ability

The ability to conceive future products, services, and even business models based on a deep understanding of technological trends and social needs, enabling forward-looking innovation.

Creativity is the ultimate weapon for humans to maintain irreplaceability in the AI era.

C. Emotional Intelligence: The "Lubricant" for Human-Machine Symbiosis

No matter how technology advances, the basic unit of society remains the relationship between people. Emotional intelligence includes:

1) Empathy and Communication Skills

The ability to deeply understand others' emotions and needs, and to communicate, collaborate in teams, and resolve conflicts effectively. This is indispensable in scenarios like project management, customer service, and leadership.

2) Self-Awareness and Regulation Ability

The ability to manage one's own emotions, maintain a positive mindset, and cope with stress and setbacks. In the fast-changing, uncertain AI era, this psychological resilience and adaptability are crucial.

3) Leadership and Impact

Motivating teams, building consensus, and driving change all require sophisticated emotional intelligence as support.

Emotional intelligence ensures that humans can still build efficient and harmonious organizations and societies in a highly technological environment.

IV. CULTIVATION PATHS FOR UNIVERSITY STUDENTS' CORE LITERACY IN THE AI ERA

Addressing the challenges of AI requires a joint effort from universities, students, and society to systematically promote the cultivation of core literacy.

A. Higher Education Reform: From "Knowledge Impartation" to "Literacy Empowerment"

1) Curriculum System Restructuring

Promote interdisciplinary education, establish "AI + X" micro-programs or minors, and encourage the integration of arts and sciences. Make courses like critical thinking, writing, and ethics compulsory core courses for all majors.

2) Teaching Model Transformation

Promote project-based learning, case teaching, and flipped classrooms, allowing students to actively apply knowledge, exercise thinking, and collaboration skills while facing real, complex problems. Encourage the use of AI as a learning tool rather than prohibiting it.

3) Evaluation System Innovation

Reduce closed-book exams with standardized answers, and increase diverse assessment methods such as course papers, project reports, oral debates, and portfolios, focusing on assessing students' analysis, innovation, and practical problem-solving abilities.

4) Faculty Team Building

Strengthen training for teachers on AI application skills, encourage teacher-enterprise cooperation, and bring cutting-edge practices into the classroom.

B. Student Self-Improvement: Cultivating a Lifelong Learning Mindset and Proactively Embracing Change

1) Mindset Shift

Transition from "learning for employment" to "learning to create value," viewing AI as a powerful tool to enhance personal efficacy, and actively learn to use various AI applications.

2) Practical Exploration

Actively participate in scientific research projects, academic competitions, internships, and practical activities, learning by doing and honing the ability to solve complex problems. Proactively seek opportunities for cross-disciplinary collaboration.

3) Literacy Cultivation

Read widely, write and think diligently, and consciously cultivate logical thinking and expression skills. Actively participate in club activities and volunteer services to enhance interpersonal communication and teamwork skills.

C. Social Support System: Creating an Environment that Encourages Innovation and Tolerates Trial and Error

1) Enterprise Participation

Enterprises should strengthen cooperation with universities, provide internship positions, build joint laboratories, and co-design courses to make talent cultivation more aligned with market demands.

2) Policy Guidance

The government should introduce policies to encourage lifelong learning, support the recognition and development of new professions, and provide a favorable policy environment and financial support for university students' innovation and entrepreneurship.

3) Cultural Atmosphere

The whole society should foster a cultural atmosphere that encourages innovation and tolerates failure, alleviating the employment anxiety of university students and allowing them to explore diverse career paths more calmly.

V. CONCLUSION

The advent of artificial intelligence is not an end point but a new starting point. It has magnified some inherent shortcomings in higher education and also provided an unprecedented opportunity for us to deepen reforms. For university students, the biggest revelation brought by AI might be that the track of life

has changed, and the measure of value is also different.

The future does not belong to those who are best at memorizing and calculating, but to those who are best at asking questions, most imaginative, most skilled in collaboration, and most adaptable – the masters of "human-machine collaboration." Universities, students, and society must work together to resolutely shift the focus of education from knowledge indoctrination to the cultivation of core literacy, collectively empowering the new generation of university students so that they can not only calmly meet the challenges of the AI era but also become the dominant force in harnessing technology and creating a better future.

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