



Technology-Enhanced Labor Education in Higher Education: Current Status, Challenges, and Innovation Paths

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Abstract. Labor education plays a significant role in enhancing students' practical operational capabilities and teamwork competencies. However, current labor education in higher education institutions in China faces dual practical dilemmas: on the one hand, some students hold cognitive biases towards the value of labor education and have not fully recognized its educational significance; on the other hand, the curriculum system has shortcomings, as teaching design tends to focus on theoretical indoctrination, which is disconnected from practical needs and fails to effectively stimulate students' participation enthusiasm. This study takes college students enrolled in higher education institutions in China as research objects, systematically collects data through online questionnaires, and focuses on analyzing their cognitive status, practical participation characteristics, and existing needs regarding labor education. Combined with the background of the digital and intelligent era, the research aims to explore innovative models of technology-enhanced labor education, providing references for universities to optimize the labor education curriculum system, improve practical paths, and deepen educational reforms.

Keywords: Higher Education Labor Education, Technology Empowerment, Practical Paths, Evaluation System.

1 Introduction

Labor education serves as a critical pathway to cultivating students' sense of responsibility, practical skills, and social adaptability, and it also constitutes an essential component of the core competencies for global citizens. With the advancement of society and the growing emphasis on the comprehensive quality of talents in the new era, labor education—regarded as a key approach to promoting students' all-round development in moral, intellectual, physical, aesthetic, and labor aspects—has at-

tracted increasing attention from the education sector. Through labor education, students can not only develop a sense of responsibility, teamwork spirit, and social practice capabilities but also establish a correct outlook on labor and enhance their comprehensive quality in practical activities.

The in-depth integration of labor education into the higher education system holds significant practical significance and long-term value for nurturing high-quality, all-round developing young talents in the new era. Labor education not only effectively improves students' comprehensive quality but also carries important value in both academic research and social practice. Currently, some college students exhibit weak awareness of labor and insufficient social practice experience, which results in their lack of ability to independently solve practical problems. Labor education enables students to enhance their practical capabilities, teamwork skills, sense of responsibility, and social adaptability, thereby fostering their growth through labor participation. Meanwhile, labor education in colleges and universities is still in the exploratory stage, facing challenges such as incomplete curriculum design and monotonous teaching content. Therefore, this study will adopt literature review and questionnaire survey analysis to explore innovative educational models that meet the needs of the new era, further enriching the theoretical system of labor education. Additionally, with the transformation and upgrading of China's economic structure, labor education needs to align with the demands of social development and the labor market, cultivating high-quality workers with innovative awareness and teamwork spirit. This will ultimately promote the in-depth integration of labor education with social needs.

2 Literature Review

Globally, research and practice related to labor education have undergone long-term development, forming diverse models with distinct characteristics. To systematically analyze their developmental context and inherent logic, this study adopts a comparative education perspective, selecting three core dimensions—policy-driven and value-oriented orientations, curriculum systems and implementation models, and technology empowerment paths and maturity levels—to conduct a comparative analysis of labor education practices at home and abroad. The aim is to go beyond descriptive listing, delve into the underlying cultural, policy, and other drivers behind institutional differences, and provide insights for the innovation paths of labor education in China.

2.1 Cross-Cultural Comparison of Policy-Driven and Value-Oriented Orientations

The positioning and development path of labor education are deeply influenced by the policy traditions and cultural values of the country or region in which it is implemented. Labor education in European and American countries is mostly derived from market-driven forces and civic literacy cultivation, while China exhibits distinct characteristics of national policy leadership. In the European and American context,

labor education has a more direct connection with career development and social adaptation. For example, Germany's dual-system vocational education model is a product of its long-standing craft culture (*Kultur des Handwerks*) and social market economic system. Its value orientation directly targets the proficient mastery of vocational skills and the early establishment of individual professional identities, reflecting a strong pragmatic tendency [1]. France's labor education, on the other hand, emphasizes the value of cultural inheritance. Through labor forms that combine practicality and cultural significance—such as artistic creation and traditional craft making—it guides students to experience the charm of traditional culture through hands-on practice, which is closely linked to its national strategy of emphasizing cultural identity. This bottom-up development model based on social needs makes the connotation and boundaries of labor education relatively flexible [2]. In contrast, the recent rise of labor education in China is driven by top-level national design and the educational philosophy of simultaneous development of five educations (moral, intellectual, physical, aesthetic, and labor education). Since the release of Opinions of the Central Committee of the Communist Party of China and the State Council on Comprehensively Strengthening Labor Education in Primary and Secondary Schools and Universities in the New Era in 2019, labor education has been rapidly elevated to a core component of the education system and entrusted with a strong value-leading function of shaping students' correct outlook on labor and forging a spirit of hard work [3]. This policy-driven development model ensures the rapid popularization and advancement of labor education at the institutional level, but it also to a certain extent leads to a tendency of prioritizing form over connotation in grass-roots practice to meet policy requirements. From a cultural perspective, China's collectivist tradition emphasizes the social value of labor and its contribution to the country, which contrasts with the individualistic culture in Europe and America that places greater emphasis on realizing personal value through labor. This is reflected in educational policies as a stronger national leadership and social integration goals.

2.2 Path Differences in Curriculum Systems and Implementation Models

At the curriculum implementation level, labor education at home and abroad presents path differences between society-centered and school-centered approaches, and their degree of integration with the real work world also varies. Foreign labor education has earlier achieved in-depth integration with the vocational system and social practice. Germany's dual-system ensures the seamless connection between students' on-the-job internships in enterprises and school learning. The digital labor education platform developed by Stanford University in the United States, which uses virtual reality (VR) technology to construct highly simulated industrial labor scenarios, reflects the high attention paid to innovation and practical application in higher education [4]. Dating back to the early 20th century, Dewey's theory of "Education as Life" laid the philosophical foundation for this "learning by doing" model, advocating that education should be integrated into real labor scenarios and social experiences [5]. China's labor education curriculum system is mainly constructed and explored within the school context. Although scholars have proposed diversified curriculum models,

such as the “three-stage progressive” model proposed by Qiu et al. (2025) in the context of emerging engineering education [6], the “labor education + STEM” integrated curriculum model by Chen et al. (2024) [7], and the “online + offline” blended curriculum system constructed by Qin et al. (2025) [8], these explorations still focus more on curriculum structure optimization and the integration of on-campus resources. Curriculum implementation still relies largely on the overall planning of schools, and the mechanism for in-depth collaboration with enterprises and society is not yet sound, resulting in insufficient integration of curriculum content with cutting-edge industrial technologies and real job requirements. This difference stems from the different ways of social resource allocation: Europe and America have a mature tradition and mechanism of social institutions participating in education, while China has long taken school education as the absolute main position.

2.3 Staged Differences in Technology Empowerment Paths and Maturity Levels

In terms of technology empowerment, foreign labor education has entered a stage of in-depth coupling with cutting-edge technologies, while China is in the initial exploration stage, with obvious gaps in the depth and innovation of technology application. In fact, the in-depth integration of modern educational technology with traditional labor education models has become an important trend. For example, the “Smart Labor Education” project supported by the European Union’s Erasmus+ program uses big data analytics to accurately mine data from students’ labor practice processes, optimizes teaching plans based on individual differences, and realizes personalized and refined labor education. Studies by Paul Grobstein and Alice Lesnick provide theoretical support for technology-enabled informal learning experiences from the perspective of learning sciences. These cases indicate that technology has evolved from an auxiliary tool to a core element reshaping the educational form in foreign labor education. In contrast, although Chinese scholars have recognized the importance of technology, relevant research mostly focuses on traditional dimensions such as curriculum structure optimization and moral education function exploration, with insufficient discussion on the innovative application of modern educational technologies such as artificial intelligence, educational big data, and virtual reality in the design, process monitoring, and effect evaluation of labor education practice. The questionnaire survey results of this study also confirm this gap: only 23% of students have experience in AI-assisted labor practice; 67% of students report that labor practice in their schools is still dominated by traditional manual labor. This reflects the lag in the integration of technology into China’s labor education, and its development still faces the challenge of transforming the top-level advantages of national policies into substantive technological innovations in grass-roots teaching practice. In summary, the analysis from a comparative education perspective shows that China’s labor education has a late-development advantage in terms of policy support, but there are gaps with developed European and American countries in the refinement of implementation, alignment with market demand, and especially the depth and innovation of technology application. Therefore, the technology empowerment path proposed in this

study aims to explore an integrated and innovative path that combines China's policy characteristics with an international perspective on cutting-edge technologies, hoping to leverage institutional advantages while using technical means to address core challenges such as the single form of current practice and the imperfect evaluation mechanism.

3 Investigation on the Current Status of Labor Education for College Students

This study targeted college students currently enrolled in domestic higher education institutions as the core research group, and collected first-hand data through online questionnaire surveys. The aim was to systematically analyze the current implementation status of labor education in colleges and universities, students' cognitive characteristics, and practical dilemmas. The questionnaire was designed around four core dimensions, including the respondents' basic information, their cognitive level of labor education, actual participation, and evaluations and suggestions on the existing labor education model, ensuring the comprehensiveness and pertinence of the survey content. A total of 220 valid questionnaires were retrieved, and the sample structure showed good balance: in terms of household registration distribution, the proportion of students from rural and urban backgrounds was close to 1:1; in terms of gender ratio, the proportion of male to female students was 1:1.25; in terms of major distribution, science and engineering students accounted for 45%, liberal arts students for 35%, and art students for 20%. This sample structure covers student groups with different backgrounds and majors, and has strong representativeness and persuasiveness, providing solid data support for the subsequent analysis of the demand differences of labor education among different majors.

From the perspective of students' cognition and attitude towards labor education, the survey results showed that most college students held a positive attitude towards the value of labor education: 72% of the respondents believed that participating in labor practice was of great significance; 71% of the students stated that there was no conflict between labor education and professional learning, and instead, the two could promote each other and develop in a coordinated manner; 69% of the students supported the inclusion of labor education in the graduation assessment index system. In terms of cognition of the connotation of labor, 62% of the students equated labor with daily life labor, showing a relatively narrow understanding of labor. Regarding the cognition of labor education approaches, 72% of the students believed that family labor education and family practical activities were the main approaches, 61% of the students mentioned school classroom teaching and theoretical learning, and 74% of the students recognized the educational value of on-campus voluntary services and labor practice. This indicates that the implementation of labor education needs to rely on the coordinated efforts of multiple subjects such as families and schools.

In terms of the specific implementation of labor education in colleges and universities, the survey found that all colleges and universities where the surveyed students were enrolled had carried out various forms of labor education activities, among

which nearly 82% had set up fixed labor education courses and regular activities. From the perspective of course content, current labor education in colleges and universities is mainly carried out through three forms: independent learning on MOOC platforms, the combination of theoretical learning and labor practice, and teacher-led theoretical teaching of labor education. In terms of the construction of evaluation mechanisms, nearly 86% of the colleges and universities have formulated special labor education evaluation plans, incorporated them into the credit system, and directly linked them to students' acquisition of graduation certificates, comprehensive quality evaluation, and scholarship assessment. The evaluation criteria mainly focus on dimensions such as the number and duration of labor participation, the quality of labor practice results, students' participation enthusiasm and feedback, team cooperation performance, labor innovation, and efficiency. In terms of participation duration, the total weekly duration of college students' participation in labor education-related courses and activities is concentrated between 1 and 5 hours. For the existing curriculum design, 62% of the students considered it generally reasonable, but some students still put forward suggestions for improvement. At the same time, the survey found that college students face many practical dilemmas in participating in labor education, mainly including the single form of labor projects, difficulties in time allocation and management, lack of targeted guidance from professional teachers, and unclear evaluation standards and reward-punishment mechanisms for labor results. In addition, labor education in colleges and universities also has common problems such as insufficient courses, rigid implementation methods, insufficient publicity and promotion efforts, and imperfect assessment and evaluation systems.

It is worth noting that in terms of the cognition and participation in technology-based labor, the survey results showed obvious shortcomings: only 23% of the students had experience in AI-assisted labor practice, such as intelligent agricultural labor and digital cultural and creative design; 67% of the students reported that the labor practice in their schools was still dominated by traditional manual labor, lacking technology-based and innovative labor projects closely combined with professional knowledge. This phenomenon is incompatible with the current development trend of digitalization and intelligence, and also reflects the lag in the integration of technology into labor education in colleges and universities.

Based on a comprehensive analysis of the survey data, the current labor education in colleges and universities mainly has the following five prominent problems: 1) Disconnection between cognition and participation. Although most college students recognize the importance of labor education, they lack initiative and enthusiasm in actual participation, showing a phenomenon of "discrepancy between knowledge and action". Especially for post-2000s college students, affected by multiple factors such as their personality traits, social development, reduced labor burden brought by the popularization of intelligent technology, and favorable family environment, they have fewer opportunities to participate in household labor in daily life, forming a habit of passive labor. 2) Imbalance between theory and practice. College students can acquire a certain amount of theoretical knowledge about labor through classroom teaching, but they generally lack initiative in the practical link, and some students even have a fear of manual labor. This leads to a disconnection between theoretical learning and

practical application, making labor practice a mere formality and difficult to achieve the expected educational effect. 3) Imperfect education system. Labor education in colleges and universities has not yet formed a systematic and standardized implementation system, lacking clear labor practice plans and goal orientation. The coverage of curriculum design and labor skill training is insufficient, resulting in students' incomplete and unsystematic mastery of labor knowledge and skills. 4) Simplification of practical forms. Current labor practice in colleges and universities is mainly dominated by simple manual labor such as campus environmental cleaning, which is not closely combined with the actual social labor demand and industry development trends. It fails to fully design targeted practical projects based on students' professional characteristics, making it difficult to give full play to the role of labor education in honing professional skills and improving social adaptability.

4 Main Problems in Labor Education for College Students

4.1 Cognitive Biases in Labor Education

The scientificity and rationality of college students' labor concepts not only affect their personal growth and success but also exert a profound impact on the overall progress of society. According to the results of this questionnaire survey, 64.41% of students clearly recognize the indispensable value of labor education. This data fully confirms the country's emphasis on labor education in recent years and the remarkable effectiveness of the all-round education policy, as the importance of labor education has been widely recognized by most college students. However, nearly 30% of students, although seemingly acknowledging the importance of labor education, fail to deeply understand the core connotation of correct labor values, resulting in obvious cognitive biases towards labor (see Fig. 1).

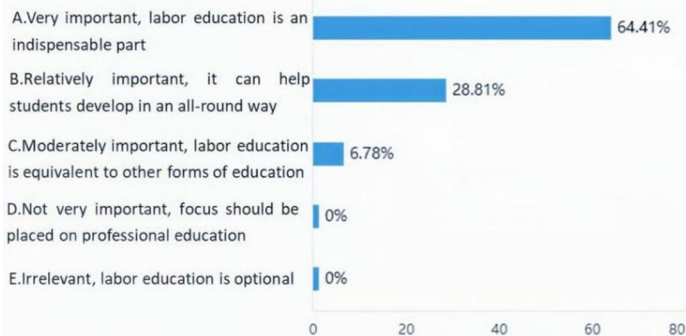


Fig. 1. Survey results on the recognition of labor education importance.

Specifically, some college students hold a one-sided understanding of labor. Many equate labor with mechanical and repetitive manual work, believing it lacks creativity and a sense of accomplishment. This essentially reflects their insufficient cognition of innovative and creative labor. The cognitive bias is even more prominent in terms of recognizing the ability-cultivation value of labor education: approximately 50% of

students consider the core role of labor education to be cultivating a sense of responsibility, while placing the cultivation of innovative thinking at the bottom. This phenomenon indicates that some college students participate in labor activities more out of responsibility or task requirements rather than actively exploring the inherent value and innovative potential of labor. As a result, their participation in labor remains at a superficial level of completing tasks, failing to truly achieve the educational goal of labor education in fostering innovative capabilities (see Fig. 2 and Fig. 3).

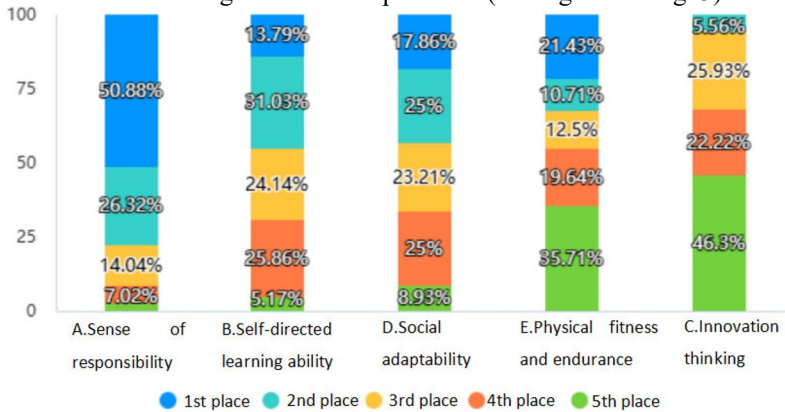


Fig. 2. Survey results on the role of labor education in personal ability cultivation (part 1).

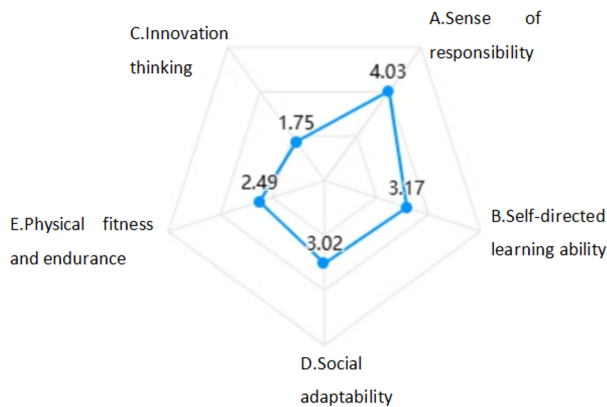


Fig. 3. Survey results on the role of labor education in personal ability cultivation (part 2).

4.2 Imperfect Labor Education System in Colleges and Universities

Although colleges and universities have actively responded to the call of national policies and launched various labor education courses and related activities, the survey results show that the current labor education system in colleges and universities still has many shortcomings, especially in the allocation of technical resources, curriculum design, and content innovation. In terms of technical resource support, 82% of students report that their schools lack modern teaching resources such as VR train-

ing equipment and intelligent practice platforms dedicated to labor education; 75% of teachers state that they lack professional training in integrating technology with labor teaching. The basic conditions for technology-enabled labor education are seriously insufficient. In terms of curriculum design, statistical data show that 36% of students report that their schools offer labor education courses, but the courses are scattered and lack systematicness; 17% of students indicate that their colleges and universities do not have fixed labor education courses and only carry out sporadic activities. The construction of regular and systematic labor education urgently needs to be strengthened (see Fig. 4).

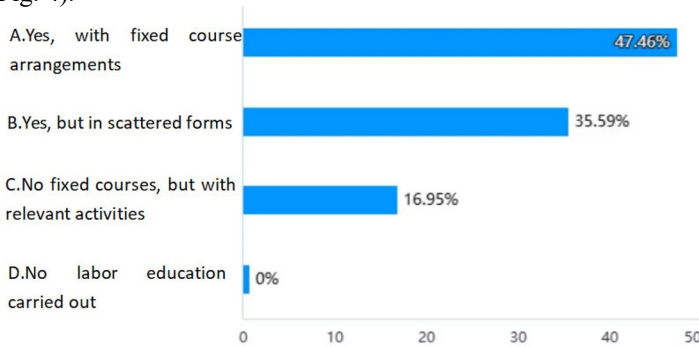


Fig. 4. Current status of fixed labor education courses or activities in your school.

At the level of teaching resource allocation and curriculum implementation, colleges and universities generally show a tendency of “valuing knowledge over labor.” Teaching resources are more inclined to knowledge-based courses, and labor education is mainly conducted through theoretical lectures or online platform learning. The survey shows that nearly 90% of colleges and universities regard independent learning on MOOC platforms as an important form of labor education. However, in practice, some students only engage in superficial learning to meet credit requirements, failing to truly understand the core connotation of labor value, which greatly reduces the effectiveness of online learning. In addition, labor education has a low weight in the talent training programs of colleges and universities. The proportion of labor-related courses such as internships and social practice is much lower than that of professional education courses, resulting in a weak comprehensive impact on students and making it difficult to give full play to the educational function of labor education. Notably, 1.69% of students are completely unaware of the labor education courses offered by their schools. Although this proportion is small, it indirectly reflects loopholes in the implementation of labor education policies and the communication of teaching notices in colleges and universities, as well as deficiencies in the integrity and standardization of the system operation (see Fig. 5).

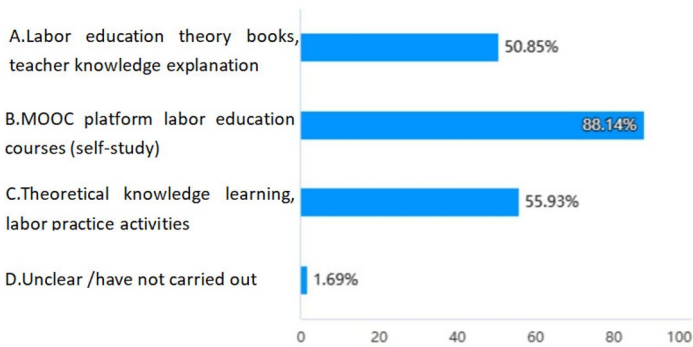


Fig. 5. Current status of labor education course content in your school.

In terms of connecting curriculum content with the needs of the times, labor education in current colleges and universities also shows obvious lag. The integration of labor education content with modern vocational technology and cutting-edge science and technology is not close enough, and the characteristics of the times are not prominent. Survey data show that 86.44% of students participate in labor education practice activities organized by the school (such as voluntary services), and 71.19% of students have participated in social internships or part-time jobs. However, these activities are mostly limited to traditional forms such as cleaning and simple work-study programs, failing to design targeted practical projects based on students' professional characteristics and lacking personalized design that teaches students in accordance with their aptitudes. Such labor education content, which is disconnected from professional learning and rigid in form, not only reduces the practicality and pertinence of labor practice but also makes it difficult for students to connect their professional knowledge with the actual needs of society, thereby weakening their enthusiasm and initiative to participate in labor education. At the same time, the forms of labor education activities lack innovation and diversity, making it difficult to meet the diverse and personalized learning needs of college students in the new era and restricting the improvement of the educational effectiveness of labor education.

5 Suggestions

5.1 Innovate the Curriculum System and Deepen the Integration of Technology and Labor Education

Colleges and universities need to base themselves on their own school-running characteristics and the talent cultivation goals of different majors, establish a flexible and adaptable labor education curriculum framework, and achieve precise integration of disciplinary features and labor practice. Specifically, technology-enhanced curriculum innovation can be promoted from four aspects. First, artificial intelligence (AI) + labor practice. Promote in-depth cooperation between colleges and enterprises to jointly develop intelligent labor training modules. For example, design practical projects such as AI-simulated industrial production line debugging and intelligent

equipment operation and maintenance for science and engineering students; build application scenarios such as AI-assisted community demand surveys and public service optimization analysis for liberal arts students, so as to realize the coordinated improvement of professional capabilities and labor practice. Second, AI-driven upgrading of teaching assistance. Construct an intelligent labor education teaching assistant system, which automatically generates personalized labor practice tasks and provides real-time feedback on problems and improvement suggestions during operation through AI technology. At the same time, based on students' historical labor participation data, establish an AI prediction model for labor behavior to accurately predict students' willingness and potential to participate in technology-based labor, providing data support for curriculum adaptation. Third, virtual reality (VR) + labor scenario reconstruction. Use VR technology to create an immersive labor practice environment: on the one hand, restore characteristic labor scenarios such as intangible cultural heritage (ICH) craftsmanship and traditional farming to inherit traditional culture; on the other hand, simulate high-risk labor scenarios such as chemical safety operations and high-alt work, so as to improve students' practical skills under zero-risk conditions and effectively solve the practical problems of limited practice venues and high safety risks.

5.2 Optimize the Evaluation System and Construct a Technology-Enhanced Diversified Evaluation Mechanism

In terms of evaluation design, it is necessary to abandon the one-sided single evaluation logic, construct a diversified, hierarchical, and scientific evaluation system, adhere to the combination of process-oriented evaluation and result-oriented evaluation, and deepen the connotation of evaluation. On the one hand, clarify the labor education evaluation standards, and conduct objective and fair assessment of students' labor practice results from multiple dimensions such as labor cognition, labor skills, labor attitude, labor innovation, and social contribution. On the other hand, actively explore evaluation innovation empowered by technology and create an integrated "technology + evaluation" model. First, develop a digital portfolio for labor education, and use blockchain technology to encrypt and store process data such as students' labor practice duration, achievement materials, peer evaluation, and teacher comments, so as to ensure the authenticity, objectivity, and traceability of evaluation data and eliminate formalistic problems such as "going through the motions" and "credit brushing". Second, introduce natural language processing (NLP) technology to conduct in-depth analysis of the text content of students' labor reflection reports and practice summaries, and automatically extract ability improvement keywords such as problem-solving, teamwork, technology application, and innovation breakthrough. This realizes the transformation of evaluation from superficiality to refinement and intelligence, and comprehensively and accurately reflects the improvement of students' labor literacy.

5.3 Optimize the Evaluation System and Construct a Technology-Enhanced Diversified Evaluation Mechanism

A scientific evaluation system for students' comprehensive quality must break the traditional limitation of valuing intellectual education over labor education and fully integrate labor literacy into the core of evaluation. Based on the scientifically verified evaluation index system constructed in this study, which is grounded in the CIPP model, colleges and universities should actively explore technology-enabled innovations in educational evaluation, promoting a transformation from a single, static evaluation to a diversified, dynamic one. First, establish a credible digital portfolio for labor education relying on blockchain technology. To address formalistic issues such as "going through the motions" and "credit brushing" in current evaluations, colleges and universities can leverage the distributed and tamper-proof characteristics of blockchain technology to encrypt and authenticate the full-cycle data of students' labor practice, based on the aforementioned index system—especially the key indicators in the process evaluation dimension (e.g., labor participation, team collaboration records). This includes the selection of practical projects, task execution logs, mid-term inspection records, final outcomes, and evaluation feedback from teachers and peers. This initiative not only ensures the authenticity and traceability of evaluation data but also generates a highly credible certificate of comprehensive literacy for students. Second, introduce natural language processing (NLP) technology to realize intelligent analysis of labor reflections. Students' labor reflection reports and practice summaries are key materials for measuring soft indicators such as labor cognition and innovative thinking in the outcome evaluation dimension. Traditional manual evaluation is inefficient and highly subjective. Colleges and universities can adopt NLP technology to conduct in-depth semantic analysis of texts automatically, quantitatively extract capability-related keywords such as problem-solving, technology application, team collaboration, and innovation breakthrough, and assess the emotional tendency and depth of thinking reflected in the content. This not only frees teachers from tedious and repetitive work but also provides objective quantitative insights beyond simple word count, achieving refined and intelligent evaluation. Third, construct a dynamic feedback and early warning mechanism based on big data. Aggregate the multi-dimensional data collected through the aforementioned technical means into the university-level educational big data platform, and align it with the evaluation index system. The platform can dynamically generate digital portraits of labor literacy at both individual student and class levels, with predefined early warning rules. For example, when the system detects that a student's data related to process participation is significantly below the normal range, it can automatically send an early warning to the supervisor, prompting timely intervention and guidance. This formative evaluation mechanism transforms evaluation from a summative judgment to a developmental guidance, truly fulfilling the function of promoting construction and improvement through evaluation. Through the above paths, technology is no longer a cold tool but a core enabler for achieving scientific evaluation and promoting student development, ensuring that the evaluation of labor education is effectively implemented and delivers tangible results.

5.4 Construct a Social Coordination Mechanism and Gather Joint Forces for Labor Education

Although the social environment is constantly changing, the core values of hard work, perseverance, and courage to strive contained in labor education have always been a spiritual banner guiding the growth of young people. For college students, the spirit of model workers, as a vivid embodiment of labor values, carries the positive social energy of diligence, hard work, and innovative progress, and is an important carrier for cultivating correct labor concepts. Therefore, it is necessary to vigorously promote the spirit of model workers across the whole society. Through various forms such as model worker deeds lectures, labor role models entering campuses, and interviews with outstanding workers, a good social atmosphere of advocating labor, respecting labor, and loving labor should be created, so that students can imperceptibly establish correct labor values and stimulate their internal motivation to actively participate in labor practice. At the same time, it is necessary to build a multi-stakeholder linkage coordination mechanism involving government-colleges-enterprises-society, with a focus on strengthening technical platform support. It is suggested that the government take the lead, colleges and universities play a leading role, and enterprises participate in jointly building a national labor education resource sharing platform to integrate high-quality resources from all parties: on the one hand, gather enterprise resources such as intelligent equipment rental services, online technical training courses, and real labor practice positions; on the other hand, integrate college resources such as MOOC labor courses, high-quality practice cases, and professional teaching staff. This provides students with rich channels for technology-based labor practice, breaks the barriers of single labor forms on campus and disconnection from social needs, and forms a strong joint force for the whole society to participate in and promote labor education in a coordinated manner.

6 Conclusion

Based on a questionnaire survey of 220 university students, it is found that although the value of labor education is widely recognized, its implementation still faces cognitive and practical dilemmas. On the one hand, students exhibit significant cognitive biases, often limiting their understanding of labor to traditional manual work while lacking awareness of innovative and technology-driven forms of labor, resulting in externalized motivation and a gap between knowledge and action. On the other hand, the higher education system demonstrates notable shortcomings, such as fragmented curriculum design, monotonous teaching content and methods, and limited integration with modern technology and disciplinary characteristics, which hinder its ability to meet the demands of the digital age. This study proposes an innovation framework driven by technology and implemented systematically. The advancement of labor education in higher institutions necessitates a technology-empowered systemic optimization of curricula, assessment mechanisms, and collaborative approaches. Future research could further explore topics such as the ethical boundaries of technology

application, long-term impact evaluations, and discipline-specific design strategies, thereby continuously revitalizing labor education in the digital era.

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Disclosure of Interests

The authors declare no conflict of interest.

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