



Research on the Practical Path of Three-Dimensional Coupling and Collaboration for the Transformation of College Employment Guidance: Driven by New Productive Forces

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Abstract. Against the backdrop of new productive forces reshaping the industrial ecosystem, the college employment guidance system is facing structural contradictions and adaptability crises, urgently in need of transformation. This paper focuses on the transformation of college employment guidance. With the core of "Research on the Practical Path of Three-Dimensional Coupling and Collaboration for the Transformation of College Employment Guidance: Driven by New Productive Forces", it constructs a three-dimensional coupling theoretical framework of "time and space-subject-content" and introduces horizontal and vertical coupling mechanisms. By systematically analyzing the collaborative dilemmas of college employment guidance in dimensions such as time series, spatial layout, guiding subjects, service content, and academic degree stratification, the study finds that traditional employment guidance has problems such as stage fragmentation, regional imbalance, content lag, insufficient subject collaboration, and lack of academic degree adaptability. To address these issues, this paper proposes the construction of a "horizontal linkage-vertical stratification" collaborative mechanism, including: developing a job competence standard database and establishing a dynamic curriculum update mechanism to achieve content collaboration; designing regional training programs to achieve time-space collaboration; building a "government-university-enterprise-industry" platform to promote subject collaboration; and implementing differentiated guidance strategies for post-graduate, undergraduate, and junior college students. The research shows that the three-dimensional coupling and collaboration mechanism can effectively enhance the system stability, precision, and adaptability of employment guidance, providing a solid theoretical foundation and practical path for achieving a deep match between the supply of higher education talents and the needs of new productive forces, and is of great significance for promoting the transformation of the college employment guidance system.

Keywords: College Employment Guidance, Three-Dimensional Coupling, Collaborative Mechanism, Transformation Practice

1 Introduction

In the era of deep integration of digital technology and the real economy, new productive forces are vigorously promoting the accelerated transformation of the industrial structure towards intelligence, high-end, and integration. The "14th Five-Year Plan for Digital Economy Development" clearly proposes to cultivate new productive forces and build a modern industrial system with international competitiveness^[1]. In this process, the demand for compound and innovative talents in various industries has increased exponentially, posing new challenges to the college employment guidance system. It urgently requires a transformation from the traditional single-skill training model to a full-cycle and precise education model. The "Several Opinions on Deepening the Integration of Industry and Education" issued by the Ministry of Education also emphasizes the need to promote the coordinated development of employment guidance and industrial needs through mechanism innovation, so as to achieve the synchronous development of talent cultivation and economic and social development^[2].

However, there are still many deep-seated contradictions in current college employment guidance work. At the supply-demand level, there is a serious mismatch between talent cultivation and actual industrial needs, resulting in insufficient employment competitiveness of graduates. In terms of resource allocation, guidance resources are scattered, making it difficult to form an effective synergy and unable to meet the diverse employment needs of students. In terms of the guidance model, the traditional model is unitary and rigid, lacking innovation and flexibility, and is difficult to adapt to the rapidly changing employment market environment. These problems are particularly prominent in aspects such as time-space connection, content adaptation, subject collaboration, and academic degree-stratified guidance, severely restricting the overall effectiveness of employment guidance work. Therefore, exploring how to construct a collaborative mechanism for college employment guidance that adapts to the development of new productive forces has become an important issue to be solved in the field of higher education^[3-4].

2 Theoretical Basis and Analytical Framework

2.1 Tables Innovative Application of the Three-Dimensional Coupling Theory

This study is based on the three-dimensional coupling theory. We construct a three-dimensional analysis framework of "time and space-subject-content" and introduce horizontal and vertical coupling mechanisms, aiming to provide solid theoretical support for analyzing the coordination problems of the college employment guidance system.

2.1.1 Time-Space Coupling: Establishing a Spatial-temporal Adaptable Framework for Collaborative Education.

From the temporal dimension, according to the development process of new-quality productivity, employment guidance is integrated into the entire study career of students, and guidance contents are precisely matched in different stages. In the early stage of enrollment, the focus is on career cognition and planning guidance; in the middle stage, it emphasizes the improvement of professional skills and the expansion of industry knowledge; in the later stage, it strengthens employment practical guidance and job matching. From the spatial dimension, employment guidance plans are customized according to the differences in industrial layouts of southern, central, and northern Jiangsu. For the high-tech industry-intensive southern Jiangsu, innovative and R&D talent cultivation is emphasized; for the manufacturing-concentrated central Jiangsu, engineering practice and technical application ability training are strengthened; for the agricultural and basic industry-dominant northern Jiangsu, application-oriented and service-type talent cultivation is focused. In this way, a basic framework with continuous time and adaptable space is constructed, ensuring that all participating subjects can carry out collaborative work efficiently at appropriate spatial-temporal nodes.

2.1.2 Subject Coupling: Constructing a Multi-Subject Collaborative Education System.

The core responsibilities of the "government-university-enterprise-industry" subjects in employment guidance are clearly defined to establish a complete multi-subject collaborative education system. The government plays a role in macro-regulation, issuing supportive policies and allocating high-quality resources to create a favorable policy environment and resource base for collaborative education. Universities, as the core of talent cultivation, undertake the main tasks of knowledge transfer, professional education, and talent cultivation. Enterprises are deeply involved in the talent cultivation process, providing practical positions and market demand feedback to achieve a seamless connection between talent cultivation and enterprise needs. Industry associations give full play to their professional advantages, conducting vocational training, formulating industry standards, and implementing qualification certification. Through building a resource-sharing platform, all subjects achieve information exchange, resource sharing, and close cooperation, thus realizing efficient resource allocation and clear division of responsibilities in the collaborative education process.

2.1.3 Content Coupling: Optimizing Curriculum and Career Planning Guidance.

To effectively meet the development needs of new-quality productivity, universities comprehensively optimize the curriculum system, integrate cutting-edge knowledge and skills such as big data, intelligent manufacturing, and artificial intelligence into the curriculum, and strengthen the deep integration of practical teaching with actual enterprise needs. Guided by the career development path of new-quality productivity, precise career planning guidance is carried out, providing strong content support for multi-subject collaborative education. A dynamic curriculum adjustment mechanism is established to update curriculum content in a timely manner, ensuring that the knowledge

and skills learned by students are always in line with the latest trends of industrial development.

2.1.4 Horizontal Coupling: Achieving Horizontal Linkages at Multiple Levels.

Horizontal coupling emphasizes the horizontal linkages at the content, time-space, and subject levels. In terms of content coordination, by developing a job-ability standard database, talent requirements of industries are accurately matched, providing a scientific basis for curriculum setting, teaching content update, and talent cultivation plan formulation. Meanwhile, a dynamic curriculum update mechanism is established to ensure that employment guidance content keeps up with the forefront of technological innovation and industrial development. In time-space coordination, regional talent cultivation plans are designed according to the industrial characteristics of different regions, realizing the close combination of university talent cultivation and local economic development. At the subject-coordination level, a "government-university-enterprise-industry" multi-subject collaborative platform is built to break information barriers, integrate resources from all parties, form a strong synergy in employment guidance work, and enhance the overall effectiveness of collaborative education.

2.1.5 Vertical Coupling: Implementing Hierarchical and Differential Guidance Strategies.

Vertical coupling focuses on the characteristics of different academic levels (master's, undergraduate, and junior college) and implements differential guidance strategies to achieve vertical penetration of multi-subject collaborative education. For postgraduate students, interdisciplinary research courses are offered, and joint cultivation bases are established to strengthen their innovation ability and promote the effective connection between their research achievements and industrial needs. For undergraduate students, the "3 + 1" cultivation model (three-year in-school theoretical study plus one-year enterprise practice) is implemented to enhance their practical ability and professional quality. For junior college students, order-based classes are jointly built, and standardized on-the-job training is carried out to improve their vocational skills and job adaptability, meeting the urgent demand for skilled talents from enterprises.

3 Analysis of the Three - Dimensional Coupling Dilemmas of Existing College Employment Guidance

Against the background of new productive forces accelerating industrial transformation, the college employment guidance system has exposed significant contradictions in time-space connection, subject collaboration, and content adaptation, forming a systematic coupling failure problem. Based on the three-dimensional coupling theoretical framework, this section reveals the existing dilemmas from five dimensions: time, space, content, subject, and academic degree stratification.

3.1 Time Dimension: Stage Fragmentation and Lack of Continuity in Employment Guidance

The current college employment guidance presents an unbalanced time - series characteristic of "loose at the beginning and tight at the end". In the lower-grade stage, career awareness education is generally lacking. Students have no clear understanding of the professional fields corresponding to their majors and future career development paths, resulting in a lack of learning motivation. In the senior - grade stage, colleges and universities often conduct intensive job-seeking training, attempting to improve students' employment abilities in a short period. However, this assault-style guidance method is difficult to achieve the desired results and ignores the continuity and system stability of career development. National college survey data shows that only 28.3% of colleges and universities incorporate career planning courses into cultivation system for the entire educational stage, and the disconnection rate between course content and industrial dynamics is as high as 65%. This stage fragmentation seriously disrupts the continuity of career development, making it difficult for students to establish a systematic career development plan, resulting in a transition gap from campus to the workplace and failing to meet the requirements of new productive forces for full-cycle talent cultivation^[5].

3.2 Space Dimension: Regional Resource Imbalance and Ineffective School - Local Collaboration

In terms of spatial layout, college employment guidance has significant problems of regional imbalance and insufficient school-local-enterprise collaboration. On the one hand, college talent cultivation is out of touch with local industrial needs, leading to regional talent supply-demand mismatches; on the other hand, the distribution of employment guidance resources among regions is seriously uneven. Colleges and universities in developed regions can attract more corporate resources and practical opportunities with their resource advantages, providing high-quality employment guidance services for students, while colleges and universities in underdeveloped regions are in a difficult situation due to resource scarcity, and students face greater difficulties in employment. In addition, school-enterprise cooperation mostly stays at the shallow internship level, and in-depth industry-university-research cooperation is insufficient. Taking the Yangtze River Delta region as an example, despite its dense concentration of colleges and universities and developed industries, there is a lack of effective collaborative cooperation among schools, local governments, and enterprises in talent standard formulation, curriculum development, and practice base construction, resulting in a talent supply-demand mismatch rate of 37.6%. This lack of collaboration in the spatial dimension seriously restricts the overall effectiveness of college employment guidance work and is not conducive to the coordinated development of regional economies and the full employment of students.

3.3 Content Dimension: Insufficient Adaptability of the Guidance System to Industrial Needs

In terms of the content of employment guidance, problems such as a lagging curriculum system, outdated cases, and insufficient integration of industry and education are prominent. Traditional career guidance courses account for more than 60%, while content related to emerging industries is severely lacking, making it difficult to meet the requirements of new productive forces for compound talents. Most of the materials selected for case teaching are historical cases, lacking discussions on frontier issues such as artificial intelligence ethics and digital economy governance, which prevents students from keeping up with the latest industry trends and hot issues and affects students' understanding of emerging occupations. The integration degree of innovation and entrepreneurship education and professional education is low, and the two fail to form an effective synergy. Students often lack professional knowledge support in the process of starting a business and are difficult to combine innovation and entrepreneurship concepts with practical professional skills, thus limiting the development of students' innovation and entrepreneurship abilities and the diversity of employment choices.

3.4 Subject Dimension: Structural Defects of the Multi - Subject Collaborative Mechanism

College employment guidance involves multiple subjects such as the government, colleges and universities, enterprises, and industry associations, but currently, an effective collaborative mechanism has not been established. The government often focuses on formulating macro policies in employment guidance work but has deficiencies in specific policy implementation and resource integration, failing to fully play its guiding role. As the main body of employment guidance, colleges and universities, despite having professional advantages in curriculum setting and teaching, encounter obstacles in deep cooperation with enterprises and industry associations and have difficulty obtaining timely and accurate industrial information and talent demand dynamics. The proportion of enterprises participating in curriculum design is less than 40%, resulting in a disconnection between curriculum content and actual enterprise needs and restricting the cultivation of students' practical abilities and professional qualities. Industry associations have rich experience and professional advantages in professional standard formulation and skills training, but their role in college employment guidance has not been fully utilized, failing to effectively promote the matching of talent supply and demand. Problems such as unclear rights and responsibilities and information barriers among various parties are prominent, resulting in fragmented employment guidance resources, making it difficult to form a joint force and seriously affecting the quality and effectiveness of college employment guidance work.

3.5 Academic Degree Dimension: Systematic Absence of Stratified Guidance Strategies

The existing employment guidance system adopts a homogeneous guidance model for students at different academic degree levels, ignoring the significant differences in ability structures and career positioning among postgraduate, undergraduate, and junior college students. The cultivation of postgraduate students' innovation abilities lacks sufficient connection with the industry, and the transformation rate of scientific research achievements is low; the cultivation of undergraduate students' practical skills is weak, making it difficult to meet the practical ability requirements of enterprises for front-line technical and management talents, putting undergraduate students under great pressure in the employment market. Junior college education should focus on vocational skills training, but currently, junior college students have poor vocational adaptability. The employment guidance work fails to fully combine the characteristics of their employment positions to carry out targeted vocational skills training and professional quality improvement, resulting in great adaptation difficulties for junior college students in the early stage of employment. Overall, colleges and universities have not constructed a complete "research-oriented-application-oriented-skill-oriented" stratified education system, unable to meet the personalized employment needs of students at different academic degree levels, affecting the overall quality and efficiency of college talent cultivation.

4 Three-Dimensional Coupling Collaborative Transformation Path for Career Guidance

4.1 Temporal Dimension: Constructing a Full-Cycle Career Development System

4.1.1 Dynamic Monitoring and Early Warning System.

Develop a dynamic monitoring platform for student career development, integrating data from academic systems, internship platforms, and campus activities. Machine learning algorithms are employed to analyze student growth trajectories and generate personalized career development reports. Establish an early warning mechanism to automatically recommend remedial courses or practical projects (e.g., an "AI Development Skills Enhancement Plan" for computer science students) for issues such as academic delays or professional competency gaps.

4.1.2 Phased Curriculum Implementation.

Lower Grades: Offer a compulsory course titled Industry Frontier Cognition, adopting a "corporate mentor + virtual simulation" teaching model. Organize visits to smart factories and participation in industry summits.

Middle Grades: Embed occupational competency assessment modules, integrating the Holland Occupational Interest Test and job competency models to formulate personalized development plans.

Upper Grades: Implement a "3+1" training model, where the final academic year focuses on enterprise project practice. A dual-mentor system (academic mentor + industry mentor) guides graduation projects.

4.2 Spatial Dimension: Strengthening University-Industry-Government Collaborative Education Mechanisms

4.2.1 Quadripartite Collaborative Platform (Government-University-Enterprise-Association).

Government: Establish an Industry-Education Integration Special Office to formulate Guidelines for Collaborative Education and an evaluation system. Provide tax incentives or land-use benefits to high-performing enterprises.

Universities: Create Regional Industry-Education Integration Alliances, divided by industrial clusters (e.g., Yangtze River Delta Smart Manufacturing Zone). Publish annual talent demand white papers.

Enterprises: Co-found "Industry Colleges" with universities, collaboratively establish laboratories and training bases (e.g., Huawei's 5G communication labs). Jointly develop curricula.^[6]

Associations: Build industry resource-sharing platforms, facilitate enterprise participation in curriculum design, and conduct vocational certification.

4.2.2 Cross-Regional Resource Integration.

Implement an "enclave internship" mechanism using VR/AR for remote training. Promote regional employment data sharing (e.g., the Yangtze River Delta's "Talent Demand Forecasting Platform" for real-time job market updates).

4.3 Thematic Dimension: Aligning Guidance Content with Industry Needs

4.3.1 Dynamic Curriculum Update Mechanism.

Form a Curriculum Review Committee comprising industry experts, HR professionals, and faculty to evaluate and refresh $\geq 30\%$ of course content per semester. Develop "micro-courses + project packages" (e.g., Battery Management System Development micro-course with real-world case studies for the new energy vehicle industry).

4.3.2 Faculty Capacity Building.

Industry Mentorship: Require corporate mentors to deliver ≥ 48 annual teaching hours and supervise graduation projects.

Faculty Internships: Mandate biannual 6-month corporate residencies for educators to translate practical experience into teaching cases.

Dual-Qualification Certification: Collaborate with associations to establish competency standards and certification for "dual-role" instructors.

4.4 Content Dimension: Innovating Digital Precision Service Models

4.4.1 Intelligent Service Matrix.

Demand Side: Apply NLP to analyze job postings (e.g., BOSS Zhipin, Liepin) for dynamic competency modeling.

Supply Side: Generate student competency profiles using academic records, awards, and internship data.

Matching Mechanism: Deploy recommendation algorithms for real-time student-job matching, supplemented with interview coaching and training.

4.4.2 Virtual Simulation and Metaverse Applications.

Develop a metaverse career experience platform simulating corporate interviews and project pitches. Co-create VR training modules with enterprises (e.g., aircraft assembly simulations for aerospace students). This framework systematically integrates temporal, spatial, thematic, and content dimensions, leveraging advanced technologies and multi-stakeholder collaboration to achieve precision career guidance and industry alignment.

5 Construction of the Guarantee System for the Three-Dimensional Coupling Coordination Mechanism

5.1 Institutional Safeguards: Refining Policy Support Systems

Issue the Specialized Policy for Digital Transformation of University Career Guidance to clarify the rights and responsibilities of governments, universities, and enterprises in collaborative education. Establish a Career Guidance Reform and Innovation Fund to subsidize universities developing innovative curricula and digital platforms.

5.2 Organizational Safeguards: Enhancing Collaborative Governance Capacity

Establish a provincial industry-education integration leadership group, chaired by a vice governor, to coordinate departments including education, industry, and technology. Implement a quarterly joint meeting system (chaired in rotation by university and enterprise representatives) to resolve technical and financial challenges in collaboration.

5.3 Resource Safeguards: Increasing Element Investment

Faculty Training: Organize annual digital skills enhancement training for over 100 career guidance instructors, taught by corporate technical experts.

Platform Development: Construct a provincial employment big data center to integrate data resources from universities and enterprises statewide.

Financial Support: Guide social capital to establish industry-education integration investment funds, providing low-interest loans to high-quality university-enterprise

collaboration projects. This framework systematically addresses institutional, organizational, and resource dimensions to ensure the sustainable implementation of three-dimensional career guidance systems, leveraging policy alignment, cross-sector coordination, and strategic resource allocation.

6 Research Conclusions

Based on the background of new productive forces reshaping the industrial ecosystem, this study addresses the structural contradictions existing in the college employment guidance system. By constructing a three-dimensional coupling theoretical framework of "time and space-subject-content" and introducing horizontal linkage and vertical stratification coordination mechanisms, it systematically proposes practical paths and a guarantee system for the transformation of employment guidance. The research confirms that the three-dimensional coupling and coordination mechanism can effectively resolve the deep-seated contradictions of traditional employment guidance in terms of broken time series, unbalanced spatial layout, lagging content supply, insufficient subject coordination, and absence in academic adaptation. Through the development of job competence standard databases, the design of localized training programs, the construction of "government-university-enterprise-industry" coordination platforms, and the implementation of stratified guidance strategies for different academic levels, the system stability, precision, and adaptability of employment guidance have been significantly improved, providing an innovative solution for achieving a deep match between the supply of higher education talents and the demands of new productive forces.

Future research will focus on three directions for in-depth expansion: Firstly, strengthen the quantitative analysis of the three-dimensional coupling mechanism, use empirical methods such as structural equation models and panel data analysis to systematically evaluate the influence weights and action paths of coupling factors in each dimension on the effectiveness of employment guidance, and reveal the internal operating laws of the coordination mechanism. Secondly, conduct case studies of typical regions and colleges and universities, use qualitative research methods such as grounded theory and multi-case comparison to extract the differential models and innovative experiences of colleges and universities with different economic development levels and disciplinary characteristics in the practice of three-dimensional coupling. Thirdly, based on the research conclusions, put forward more operable policy recommendations, promote the formation of more applicable employment guidance transformation programs, and help higher education better serve national strategic needs and the development of new productive forces.

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